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## Contributed Articles and Reports

Contributions suitable for this paper, either in the form of special  
articles or as letters discussing municipal matters, are invited and  
paid for.

City officials and civic organizations are particularly requested to  
send to Municipal Journal and Public Works regularly their annual  
and special reports.

## Information Bureau

The Information Bureau, developed by twenty-one years' research  
and practical experience in its special field, is at the command of our  
subscribers at all times and without charge.

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## MILLIONS IN SEWAGE AND GARBAGE.

About two thousand billion gallons of sewage flow through  
the sewers of American cities in a year. If the valuable  
ingredients in this could be recovered so as to yield a pro-  
fit of only one cent a thousand gallons, the total profit  
would be twenty million dollars a year.

About ten million tons of garbage a year are created  
in this country. The grease and tankage in this could be  
sold for probably \$30,000,000. The net profit would be less  
than this by the cost of recovering the grease and tankage.

There is little question that there is more than \$50,  
000,000 of real value in the grease and fertilizer which is  
recoverable annually from the country's sewage and garbage.  
But if the recovering costs \$100,000,000, or even \$51,000,000,  
it will not be performed. Chemists, sanitarians and others  
have for years been attempting to solve the problem of  
making possible the securing of returns that exceed the cost  
of the process. A discussion of some of the fundamental  
conditions of the problem will be given in the next issue.

## PAINTING STANDPIPES.

We have noticed recently an interest in the subject of  
the painting of standpipes, as evidenced by the number of  
inquiries on the subject that have been addressed to our  
Information Bureau. We therefore feel sure that the pa-  
per on this subject published in this issue will be welcomed  
by many. We also believe that there are many water works  
superintendents who should give the matter thought but  
are not doing so. Few standpipes can go unpainted for  
many years without rusting, and a rusting standpipe is  
approaching collapse.

## THE MUNICIPAL BOND MARKET

October set a new record for the sale of municipal bonds,  
the total amount of such sales being about \$65,000,000, which is  
nearly eight times as great as the sales for October, 1918, and  
nearly twice as great as any previous October. Also, the bond  
sales for the ten months of this year have totaled \$582,000,000,  
which exceeds by nearly 40 per cent the largest previous total  
for a similar period. One of the biggest issues was that of \$3-  
000,000 by the city of Pittsburgh, sold on a 4.29 per cent basis.  
The territory of Hawaii sold \$1,500,000 on a 4.28 per cent basis,  
while other large borrowers in October were the state of Mi-  
chigan, \$1,500,000; Jersey City, \$2,151,000; Des Moines, \$1,  
025,000, and Phoenix, Ariz., \$1,300,000.

These bonds, sold in the latter part of the year, are most  
of them, it is probable, to be used for construction of public  
works in 1920. These and other indications point to the con-  
clusion that public officials are coming to the conclusion that  
prices of material and labor for public works are not likely to  
fall for a considerable time and may even rise further, and  
that there is no valid argument in favor of longer postponing  
public works. If only the materials and labor can be obtained,  
next year should be a record year in the construction of such  
works.

## PAINTING IRON AND STEEL STANDPIPES!

Conclusion of the Author from Data Collected from Cities All Over the Country and From Personal Experience—Thorough Cleaning and Immediate Painting with Red Lead Recommended.

By CHARLES W. SHERMAN.\*

The proper maintenance of an iron or steel standpipe involves periodic painting to prevent corrosion which would weaken and ultimately destroy the structure. The protection of the exterior surface involves no particular difficulty, as it can be inspected at any time, and the coating can be replaced whenever it may appear necessary or desirable. A paint coating on the outside surface of the standpipe is subject to practically the same conditions as one on a bridge or building. The interior surface is, however, difficult to protect, being constantly in contact with water. Moreover, it can be inspected only at intervals and with some difficulty, and it is often difficult or impossible to leave the standpipe empty for a sufficiently long period to clean and paint the surface in the most desirable way.

The durability of a protective coating on the interior surface of a standpipe is dependent not only on the qualities of the coating itself, but also on the character of the plates to which the coating is applied (whether wrought iron or steel), the cleanness, dryness, and temperature of the surface when the coating is applied; the character of workmanship; the character of the water; the amount of ice formation in winter; fluctuations in the water level, etc.

Data relative to the conditions existing when coatings were applied have comparatively seldom been made a matter of record. Indeed, it is more often than not the case that the kind of paint and the quantity used are not recorded. Consequently, the amount of definite information obtainable, even by extended inquiry, is comparatively limited, and much of it is of doubtful value.

In an attempt to bring together such information as may be obtainable, relative to actual experience with standpipe paints, Messrs. Metcalf & Eddy sent inquiries to water works in the northern and eastern parts of the United States where iron or steel standpipes are in use, requesting information as to the dates of painting, kind of paint used, preparation of the surface for painting, and other significant data. In general, the water works superintendents were generous with their responses, which were received during the winter of 1916-17, but in a disappointingly large number of cases the responses were, in effect,—"The writer has been here but a short time. The former superintendent left no records and I do not know what paint was used or when it was applied."

The accompanying tabulation contains the significant data received in response to this inquiry, together with some information available from other sources. Unfortunately, it has not been practicable to bring the information down to date before presenting this paper. The returns, however, represent the conditions existing up to the time the United States entered the war, and it is probably fair to assume that very little in the way of standpipe maintenance has been done during the period of the war.

The data tabulated are not susceptible of being summarized or averaged. In a few cases it will be noted that the standpipe has not been painted since erection. There are doubtless cases in which the quality of the water is such that it protects rather than corrodes the metal. Such cases are, however, rare and the experience tabulated seems to indicate that as a rule an iron or steel standpipe should be thoroughly cleaned and painted inside, at least as often as once in four or five years. Perhaps, however, if the cleaning were as thorough as would be accomplished by means of the sand blast, and if a protective coating were then properly applied, the interval between paintings could be materially extended.

In response to the letter of inquiry, Mr. A. H. Kneen, of Philadelphia, sent a report entitled "Painting the Inside of Standpipes," which is submitted herewith as an appendix, and which contains the best and most complete comparative data which have come to the writer's attention.

\*Paper before the New England Water Works Association.

\*Of Metcalf & Eddy, Consulting Engineers, Boston, Mass.

Mr. Kneen painted two standpipes with vertical stripes of different kinds of paint, and observed the conditions after two or three years of service. The only paints which gave reasonably good service were a red oxide of iron paint, and red lead.

Most of the paints used were undoubtedly proprietary articles, and although one red oxide of iron paint showed "good" or "very good" results, several others characterized the same way in his tabulation gave "bad" or "very bad" results. It is to be noted, too, that red lead when used was employed only in the first coat, yet the results were characterized as "good" or "very good." It is not impossible, therefore, that two or three coats of red lead would have shown better protection than any of the other paints.

The engineers of the Metropolitan Water Works have adopted the policy of cleaning the steel by sand blast, and applying three coats of red lead to the interior surface of their steel standpipes. The following quotation from the fifteenth annual report of the Metropolitan Water and Sewerage Board describes the cleaning and painting of the Bellevue Hill standpipe:

"On March 25 the tank was taken out of service and drained, and the work of sand blasting and painting the steel was begun March 30 by the W. L. Waples Company of Boston, subcontractor for this work. The plant used consisted at first of a twenty horse-power gasoline-engine-driven air compressor, a compressed air reservoir, two lines of air hose and two nozzles. Sand blasting was stopped in the latter part of the afternoon of each day, and the cleaned surfaces were painted before rusting commenced. The force employed included 1 foreman, 2 painters, who also did sand blasting, and 1 helper. This force could sand blast and paint an area of about 330 sq. ft. per day. Later, in order to increase the rate of progress, a second compressor operated by an automobile engine, was installed on April 19. The entire inside and outside surface of the tank, having an area of 35,650 sq. ft., was sand blasted and painted. Work was completed June 14, with the exception of the third coat on the outside, which has been deferred until after the masonry tower which encloses the tank is completed. All painting materials were furnished by the department, but were mixed by the contractor under the direction of the engineer. For the inside of the tank, National Lead Company's red lead in oil paste, litharge, and Spencer-Kellogg & Son's boiled linseed oil, were used; the first coat natural color, the second and third coats tinted with lampblack in oil. For the outside of the tank, red lead paste, raw linseed oil, and drier were used for the first coat, and for the second coat white lead, raw linseed oil, turpentine, and drier tinted with lampblack were used. One gallon of red lead paint was sufficient to cover 700 sq. ft. of surface with one coat. The subcontractor's price for sand blasting and painting the tank was \$1,600."

The writer inclines to the opinion that the method just quoted represents the best practice of the present time. He would put especial emphasis on the thorough cleaning of the metal, and the immediate application of the paint to the cleaned metal before the latter has cooled and moisture has condensed upon it.

"Every specification for painting bristles with clauses prescribing what shall or shall not be done, and still the fact remains that there are more failures than even indifferent successes, especially on work painted at the shops before shipment. The causes for the irregular and indifferent results are not difficult to ascertain. They are the improper application of the paint to dirty, greasy, moist or chilled, rusty or mill-scaled surfaces. No marked improvement in these uncertain results can be had until the same importance is attached to the 'paint question,' not only on paper, but in the actual supervision of the painting in all of its stages, as is given to the minutest construction details."

With regard to the coating to be applied to the metal after cleaning, it appears probable that not only red lead, but several of the graphite and red-oxide-of-iron paints, and perhaps certain enamel-like coatings, will give satisfactory protection. From such information as he has, the writer believes red lead to be the best. Wood, in "Rustless Coatings," says, "The protective qualities of a well-oxidized pure red lead and a pure oil paint, properly applied to any structure under any exposure, except to the action of hydric-sulphide gas, cannot be gainsaid." It has been used for many years for painting the bottoms of steel and iron ships, and has given the best satisfaction of any paint used for that purpose. No other substance has been put to such severe trial and shown so good results;

\*"Rustless Coatings," by M. P. Wood.

but unfortunately the use on standpipes has been comparatively limited,—probably because of a lurking, but unfounded, fear of lead poisoning if the water remains in contact with red lead paint.

It is obviously unfortunate that the data available are so fragmentary and inconclusive. It is to be hoped that the superintendents having charge of iron and steel standpipes will realize the necessity for more definite information and will make careful record of all the conditions affecting the durability of standpipe coatings, and that at some future time it may be possible to bring the data together and draw positive conclusions from them.

*Note: The tabulation of data referred to will be given in the next issue.*

The paper by A. H. Kneen, referred to by Mr. Sherman, is given below.

To obtain better information as to a suitable paint for protecting iron under water, the writer decided to paint the inside of a standpipe with different paints, for experimental purposes.

The first samples were applied in August, 1909, the iron being carefully cleaned with wire brushes, and loose scale chipped to clean iron. The results of our experiments to date may be of interest to water works having standpipes and towers, and the results that we have obtained to date are tabulated herein.

Our experiments have been applied particularly to the inside of the tank, as we have found that the outside can be protected by a good lead, iron oxide or graphite paint, which, if of proper quality and properly applied, will protect the iron for at least five years, unless subject to unusual conditions. Usually the appearance of the outside will call for painting before the necessity.

In 1910 a smaller tank than the first one used for experiments was erected, and this was painted on the inside with different paints, and is still being used for experimental purposes as it is more accessible than the first.

The kinds of paint applied to the two tanks, and the results found by inspection, are listed in Tables 1 to 4—Tables 1 and 2 covering the first tank, and Tables 3 and 4 covering the second tank. The manufacturers of the various paints used have been omitted.

Table No. 1—Tank 40 ft. in diameter by 50 ft. in height. Samples about 25 ft. in width by 50 ft. in height.

Kind of Paint.	Two Coats.		Condition.	
	Date applied, August, 1909.	Date of Inspection.	Tank Half Full of Water.	Tank Empty.
1. Iron oxide .....	Good.	April 27, 1911.	Good.	Fair.
2. Iron oxide .....	Bad.	September, 1912.	Bad.	Bad.
3. Graphite—black .....	Bad.		Bad.	Bad.
4. Asphaltum—black .....	Very bad.		Very bad.	Very bad.
5. Portland cement (brushed on) .....	Very bad.		Very bad.	Very bad.

Table No. 2—Same tank as Table No. 1. Samples about 8 ft. in width by 50 ft. in height.

Kind of Paint.	Two Coats.		Condition.	
	Date applied, September, 1912.	Date of Inspection.	Tank Half Full of Water.	Tank Empty.
1. Oxide of iron—red .....	Very good.	May, 1914.	Very good (best).	Fair.
2. Oxide of iron—black .....	Very bad.		Very bad.	Bad.
3. Tar base—black .....	Very bad.		Very bad.	Bad.
4. Oxide of iron—red .....	Fair.		Fair.	Bad.
5. Oxide of iron—red .....	Fair.		Fair.	Bad.
6. Pitch—black .....	Very bad.		Very bad.	Very bad.
7. Graphite—carbon .....	Very bad.		Fair.	Fair.
8. Graphite—carbon .....	Very bad.		Fair.	Fair.
9. Oxide of iron—red .....	Fair.		Good.	Good.
10. Car. coating—black .....	Good.		Very bad.	Very bad.
11. Oxide of iron—red .....	Fair.		Fair.	Fair.
12. Oxide of iron—red .....	Fair.		Bad.	Bad.
13. Oxide of iron—red .....	Very bad.		Bad.	Bad.
14. Tar—black .....	Very bad.		Very bad.	Very bad.
15. Red lead, first coat; Metallic brown, second coat .....	Good.		Good.	Good.
16. Flexible tank, oxide of iron—red .....	Good.		Good.	Good.

Table No. 3—Tank 30 ft. in diameter by 39 ft. in height. Samples about 16 ft. wide and 39 ft. high. Painted May, 1910.

Kind of Paint—Two Coats.	Condition.	
	Date of Inspection.	Tank Empty.
1. Graphite .....	Feb. 1911.	Sept., 1914.
2. Rubber paint .....	Bad.	Bad.
3. Oxide of iron—red .....	Good.	Very good.
4. Oxide of iron—red .....	Bad.	Bad.
5. Red lead (1), metallic brown (2) .....	Fair.	Good.
6. Oxide of iron—red .....	Good.	Bad.

Table No. 4—Same tank as Table No. 3, repainted on inside, September, 1914. Twelve samples about 8 ft. by 39 ft. in height.

Kind of paint—Two coats.	Inspected Dec. 26, 1916.	
	Tank Half Full of Water.	
1. Oxide of iron—red .....	Good.	
2. Pitch—black .....	Bad.	
3. Oxide of iron—red .....	Bad.	
4. Asphalt and Portland cement .....	Bad.	
5. Red lead, first coat; Metallic brown, second coat—brown .....	Very good.	
6. Red lead lute, first coat, metallic; second coat, brown .....	Bad.	
7. Oxide of iron—red .....	Bad.	
8. Tank paint, pitch—black .....	Bad.	
9. Tank paint, oxide of iron—red .....	Bad.	
10. Roof coating—pitch—black .....	Bad.	
11. Tank paint—oxide of iron—red .....	Good.	
12. Stickite No. 3 pitch (black) .....	Bad.	

Samples marked "Good" and "Very good" had comparatively few tubercles on surface and no scaling or blistering. Samples marked "Fair" had more tubercles and some scaling and blistering. Samples marked "Bad," the surface was fairly well covered with tubercles and some blistering and separations had taken place. Samples marked "Very bad," the surface was generally covered with tubercles and the paint badly scaled and very badly blistered. In the painting of September, 1914, the red lead and metallic brown paint used was mixed on the ground by our chief painter and best quality of everything used.

#### COST.

Labor cost, which covers cleaning and the application of two coats of paint, is usually less than \$20.00 per thousand square feet. The amount of paint required for two coats on the inside has averaged  $5\frac{1}{2}$  gal. per thousand square feet, or one gallon of paint covers about 180 sq. ft. of iron with two coats. Assuming that the paint costs \$1.50 per gallon, the cost of paint for two coats would be \$8.25 per thousand sq. ft., which, added to the labor cost, makes the total cost \$28.25 per thousand square feet.

The iron can be prepared for the paint by the sand blast, and other protective coatings can be secured with five-year guarantees, but the expense of such cleaning and such application at the prices quoted is, in our judgment, too great to warrant the expenditure.

Under the writer's supervision, we have had the inside of fifteen standpipes painted and repainted in the past seven years, the combined area of which is over 112,000 sq. ft., and the results obtained are similar to those obtained in the experimental tanks. Our conclusion to date is that paints having pitch or asphalt for a base, applied in this manner, are not suitable for iron in contact with water, but that two-coat work with a good quality of iron oxide paint or a paint with a good red lead base for the first coat, and an iron oxide paint for the second coat, if the iron is properly cleaned and the paint is properly applied, will protect the iron in contact with water for at least four years, unless the water is of unusual quality or the conditions are different than usually met with in water-works practice.

#### BIBLIOGRAPHY.

- The Design of Elevated Tanks and Standpipes; C. W. Birch-Nord, Trans. Am. Soc. C. E., Vol. 64, 1909, p. 526.  
Water Works Handbook; Flinn, Weston & Bogert.  
Water Works Management & Maintenance; Hubbard & Kiersted.  
Public Water Supplies; Turneaure & Russell.  
Journal of the New England Water Works Association; Standpipes; Byron I. Cook, Vol. 14 (1899-1900), p. 124 (with discussion).  
Paint for Standpipes and Methods of Applying; general discussion, Vol. 26 (1912), p. 387. The water Tank at Fall River, Mass.; Patrick Keiran, Vol. 11 (September, 1887, p. 25), discussion by M. M. Tidd. How We Painted Our Standpipe; Joseph E. Beals, Vol. 3, 1888-89, p. 157.  
Painting Structural Steel; A. H. Sabin, Trans. Am. Soc. C. E., Vol. 77, 1914, p. 952.  
Rustless Coatings; Corrosion and Electrolysis of Iron and Steel; M. P. Wood (New York, John Wiley & Sons, 1904).  
Red Lead and How To Use It; A. H. Sabin (New York, 1919).

#### BREAKING UP A CONCRETE BRIDGE.

A reinforced concrete bridge 30 feet long and 16 wide and its concrete abutments (one of which had been undermined by a flood) in Iowa were removed by dynamite recently for the county commissioners by Jay J. Jackson, a professional dynamiter, it being believed that this would be cheaper and quicker than by using sledges. There were three girders, each  $2\frac{1}{2} \times 3$  feet and strongly reinforced.

The earth was first blasted out from behind the abutments by discharging simultaneously a pound of dynamite in

each of several holes three feet deep and about 6 feet apart. The abutments were about 8 inches thick, but with a projection under each girder. Directly under each of these projections was placed  $3\frac{1}{2}$  pounds of dynamite. These were fired simultaneously and let girders and floor fall into the water, which was three feet deep.

Five sticks of dynamite were then tied together and lowered through a hole cut in the floor, held in contact with a girder and exploded. By repeating this process several times the girders and floor were completely broken up. Fast dynamite—60 per cent. straight N. G.—was considered best for such work. Better results could have been obtained by firing all the shots together, but the proximity of buildings made it inadvisable. As it was, there was no flying debris.

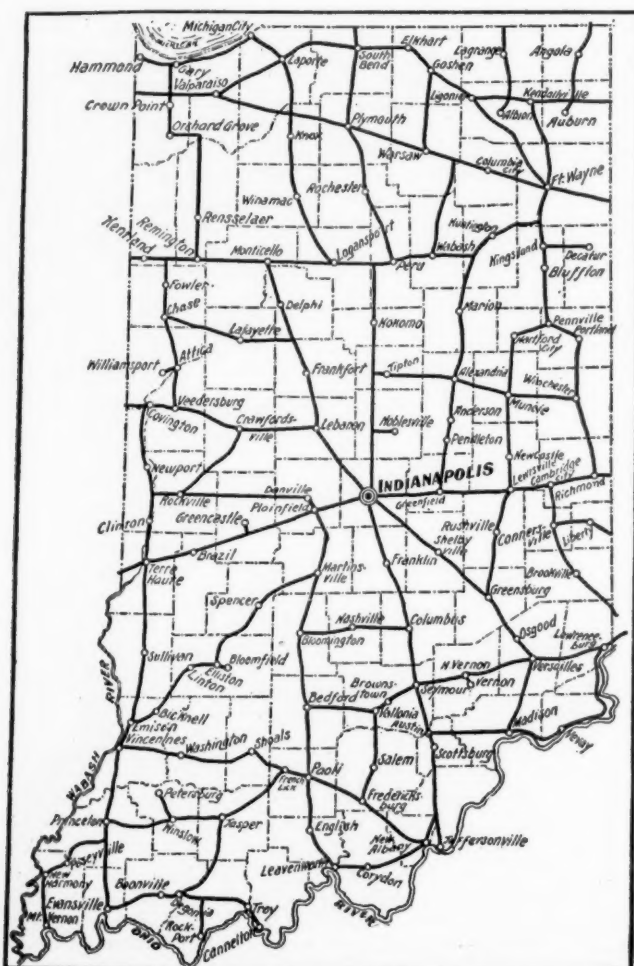
### COLORADO HIGHWAYS.

Up to November, the Federal Aid projects in Colorado approved by state and national government totaled 117 in number and 882.9 in miles, the estimated cost being \$5,425,210. Of these, 84.35 miles are to be of concrete, and the remainder only graded, graded and drained, or graded, drained and surfaced. Two bridges to cost \$140,000 are included also.

In addition, there are state-aid projects totaling 10.6 mile of concrete, estimated cost \$148,237; 17 miles of grading, draining and surfacing estimated to cost \$154,180, and two bridges to cost \$4,807. The state will also pay \$197,314 as its share of forestry road projects.

### INDIANA'S STATE HIGHWAYS.

One hundred million dollars will be spent by the highway commission of Indiana during the next ten years, according to governor Goodrich. This commission was



Map of Indiana's proposed system of improved state highways

provided for by a highway law passed this year, and has already awarded contracts for about 134 miles of road. The specifications adopted by the commission provide for cement concrete, bituminous concrete, and monolithic brick, and bids are invited for all three in each case. So far the contracts let total 121 miles of concrete and 13 miles of bituminous concrete. Seven contracts have been let for the "National Road," three for "Lincoln Highway," three for "Madison Road," three for "Range Line Road," two for "French Lick Route," and one for "Niles Road," "Michigan Road" and "Louisville Road." The proposed system of state highways, as shown by accompanying map, covers the entire state quite completely.

The commission has chosen as director L. H. Wright, who has been affiliated with various farm organizations for a number of years. As chief engineer it appointed H. K. Bishop, who for two years was district engineer of the U. S. Bureau of Public Roads in charge of Federal Aid in Ohio, Pennsylvania, Delaware, West Virginia, Maryland and North Carolina.

### ELECTRIC WELL PUMPING IN SAVANNAH

An electrically driven deep-well pump has recently been put into service by the city of Savannah, Georgia, which is furnishing 4,000,000 gallons of water a day. The water comes from a well 519 feet deep, the top 110 feet of casing being 24 inches diameter, and the remainder 16 inches. A Layne & Bowler centrifugal pump is placed just above the bottom of the twenty-four-inch casing, and is driven by a 200 h. p. Westinghouse Electric vertical induction motor, 2200 volt, 1175 revolutions per minute.

The well water is not only purer than that previously pumped at the river station, but is softer than any well water previously used by the city, which comes from different water-bearing strata. Contracts were let for five wells, the pumps in the others to be driven by one 100 h.p., one 200 h.p., one 250 h.p., and one 300 h.p. motor. All the motors are above ground except one, which is in a pit set under the street pavement.

The cost of operating this electric pump is estimated to be \$10 a million gallons or \$40 a day, while the plant which it replaces cost \$65 a day to pump one million gallons.

### WATER WORKS FOR A SMALL VILLAGE

#### Place of Five Hundred Population Has Spring Water Pumped to Water Tank, Fire Protection and Sewerage System.

The village of Montague, Mass., although having a population of only 500, has a public water supply which furnishes fire protection and also rendered possible the construction of a sewerage system. There are in the village about one hundred houses which can be served by the water works system, and ninety of these are now using it.

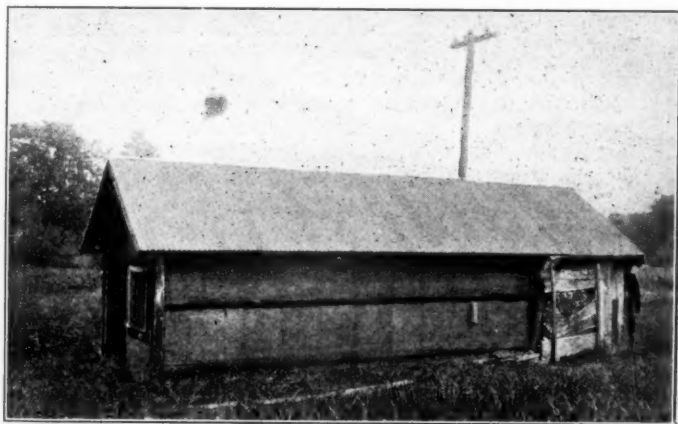
Formerly the inhabitants of the village obtained their supply from individual private wells, but about one-third of these went dry every summer. E. L. Bartlett, who owned property in the village, decided that this condition ought to be remedied and utilized springs near the village from which water emerged through clean gravel, which water when analyzed by the State Board of Health was pronounced to be as good as any to be found in the state. These springs were developed and the water from them collected in a reservoir, and about three miles of water mains were laid, which permitted carrying the water to practically all of the houses in the village. Seven fire hydrants have been located in the village and connected with the distribution system.

The springs were about on the same level as the village and pumping was therefore necessary. A tank was erected, enclosed in a tank house, and a pumping plant. The value of the entire plant, including reservoir and buildings, at the present prices would be about \$12,000. While studying the proposition, a measurement of the



RESERVOIR THAT FURNISHES SUPPLY.  
All the water is from springs.

flow of the spring showed that this amounted to more than a million gallons a day, which was several times what would be required for the use of the village for many years to come with normal growth. Owing to the small amount of money which could be used for operation, a steam pumping plant was impracticable, and as the flow from the springs



PUMP HOUSE, CONTAINING RAMS AND ELECTRIC PUMP.

was many times the demand, it was decided to put in a water ram. Three 4-inch Rife rams were installed about eight years ago and are still working satisfactorily, but recently there appears to be a slight clogging of the pipes, probably from corrosion. This plant can deliver 20,000 gallons a day. As an emergency measure, Mr. Bartlett has also installed a Rumsey triplex electric pump, which has been used occasionally to supplement the water supplied by the rams. Two years ago this system supplied water for running a steam-shovel on railroad work a mile and a quarter away, the shovel using 4,000 to 7,000 gallons a day, and during this time the electric pump was used a considerable part of the time.

The water plant was installed in 1911, and in 1913 the town put in a sewerage system at a cost of about \$5,000, the sewage being discharged into the river below the village.

Although the owner of the plant, Mr. E. L. Bartlett included fire hydrants in the system and they have been used for extinguishing fires and have secured reduced insurance rates for property owners, the village has never paid anything for this fire protection. Since the water was put in the insurance rate has been very materially decreased. Recently the village purchased at a cost of \$2,000 a combination chemical and pumping engine (shown in the accompanying illustration) and is placed in class E by the underwriters and has been given to understand that it will probably be placed in class D, which will reduce the rate still more. The

water tank gives 20 to 35 pounds pressure at the street level. Property in the village has increased from 30 to 40 per cent in value since the plant was put in, which increase is claimed to be due very largely to the water system and the sewerage system which it made possible.

The charges for water for family use are \$10 per year per family, with \$3 for each additional faucet, \$4 for bath tub and \$4 for water closet.

#### WISCONSIN HIGHWAY WORK FOR 1920.

More than \$6,000,000 worth of road work, to be performed with Federal and state aid, is contemplated by the state of Wisconsin for the year 1920. There are in all 93 different projects scattered throughout the various counties. Of the cost of each of these projects, the Federal government and the state will pay two-thirds and the county one-third. This estimate does not include any work to be done without such aid.

The kind of work, the number of projects employing each kind, and the estimated cost of the total amount of each kind of work, are shown by the accompanying table. It is seen that, of the 93 projects, 24 do not include surfacing the road. Of the remaining 69, 32 include concrete surface, the total estimated cost of these concrete projects totaling \$2,962,500, which is more than half of the total estimated cost of all projects which involve surfacing. Surfacing with gravel, disintegrated granite or shale is called for in 27 projects, of which

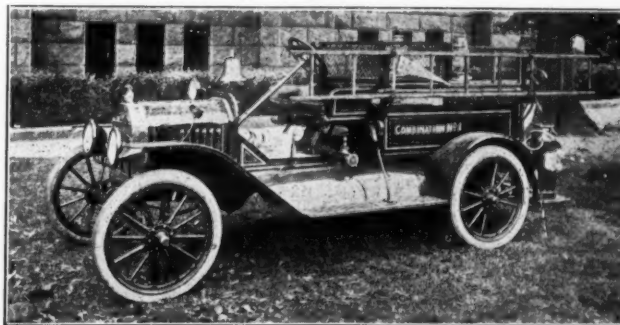


END VIEW OF TANK HOUSE.

Height of Water Gauge Seen at Left Side of House.

the total estimated cost is \$1,380,200. Two projects, estimated to cost \$102,000, employ bituminous macadam for the surface construction. The surface treatment on the remainder consists of clay, sand clay or top soil.

In addition to the federal and state-aid highway work, it is expected that there will be considerable bridge work done in the state. Chapter 313 of the laws of 1919 requires that the Highway Commission notify each county of the bridges which, in its opinion, are dangerous for travel and should be rebuilt immediately. The Highway Commission has notified the counties of the bridge work which, under this law, should be done



MONTAGUE'S CHEMICAL AND PUMPER.

in 1920. This work will be paid for with county and state aid funds and will all be concrete construction except in one case. The bridges needing re-construction number 51, of which 37 are estimated to cost not over \$5,000 a piece. The total estimated cost of these 37 is \$86,750, the several costs ranging from \$200 to \$5,000. Of the more expensive bridges the total estimated cost is \$171,550, the individual costs ranging from \$5,700 to \$57,000. The last is the only bridge not planned to be of concrete, and this will be a steel bridge containing six 70-foot plate girders to be built in the city of Tomahawk.

Douglas county has recently held a special election at which it voted \$1,200,000 for improving 174½ miles of road, of which 19 miles will be of concrete, 129 miles will be gravel and 26½ miles will be graded only. Only \$50,000 of this is included in the Federal and state aid work listed above.

**Federal and State Road Projects in Wisconsin for 1920.**

	Number of Projects	Estimated Cost
Grading, draining and culverting.....	22	\$1,053,060
Grading, draining, culverting and 15 ft. concrete surface.....	28	2,767,500
Grading, draining, culverting and 20 ft. concrete surface.....	2	93,000
Grading, draining, culverting and 24 ft. concrete surface.....	1	36,000
Grading, draining, culverting and 16 ft. concrete surface.....	1	66,000
Grading, draining, culverting and graveling.....	23	1,061,850
Grading, draining, culverting and surfacing with disintegrated granite.....	1	24,000
Grading, draining, culverting and surfacing with shale.....	3	94,350
Grading, draining, culverting and claying.....	3	102,000
Grading, draining, culverting and surfacing with sand-clay.....	1	30,000
Grading, draining, culverting and surfacing with top soil.....	3	39,750
Grading, draining, culverting and surfacing with bituminous macadam.....	2	102,000
Grading, draining, culverting and bridging.....	1	42,000
Grading, draining, culverting and partly surfacing.....	4	348,000
Improving with gravel surface 15 ft. wide.....	2	45,000
Relocation and construction.....	2	45,000
Grading and bridging.....	1	75,000
Totals.....	93*	\$6,024,450

\* Seven projects combine two kinds of surface, or offer them as alternatives. In such cases, half the estimated cost was apportioned to each of the two.

### VERTICAL FIBER BRICK PAVEMENT.

#### The Advantages of This Type of Pavement, and Some of the Latest Developments—No Lugs and Bituminous Filler.

The advantages of what is known as "vertical fiber" brick for paving purposes, and some of the latest developments, were set forth in a paper before the American Society for Municipal Improvements on November 13th\* by Clark R. Mandigo, consulting engineer to the Western Paving Brick Manufacturers Association.

Beginning with a history of the progress of paving brick construction, through repressing, wire cutting, and the wire-cut lug, Mr. Mandigo explained how experiments had shown that the forcing of the clay through the die in the process of manufacture with an auger machine, formed laminations or fibres approximately parallel to the axis of the machine, or, more exactly, in cone-shaped formation. As the bricks are cut by passing wires through the clay column at right angles to it, the fibres are perpendicular to the wire-cut faces. The following paragraphs are quoted from the paper.

These experiments naturally led to the conclusion, that to give the greatest wear resistance and strongest paving surface, the brick should be laid so that the cones forming the internal structure and the elongated particles of shale should be perpendicular to the pavement surface. The height of the die would then determine the width of the brick, and the spacing of the wires in the wire cutter would determine the depth of wearing surface, the reverse of the case in any other form of paving brick. For want of a better descriptive name, Vertical Fiber Vitrified Paving Brick was chosen to distinguish this form of brick from the others.

\*Although this issue is dated November 1, owing to the printers' strike it was not actually published until the 15th.

All forms of paving brick are piled on edge in the kiln so that the axes of the structural cones mentioned lie in a horizontal plane. The weight of the brick then presses the surfaces of the cones together except on the extreme ends of the brick and makes them more readily fused by heat. An attempt to burn pavers piled the other way in the kiln produced brick so badly laminated as to be worthless. In a certain brick plant in the West, piling on edge did not prevent the cones separating on the ends of the brick where the surfaces were nearly vertical in the kiln, producing brick with weak and laminated ends. Mr. Fuller overcame this by using a die 13½ inches long and cutting off 2½ inches from each side of the clay column before it went to the cutter.

As a result of these investigations, the Vertical Fiber Vitrified Paving Brick was adopted as a standard by the Western Paving Brick Manufacturers Association in 1912. In this type of pavement the brick are laid flat with one wire-cut surface uppermost. The advantage gained by so laying the brick that the internal structural layers are vertical may be slight in a well manufactured brick compared with the importance of the other steps in the process of manufacture, but it represents an additional factor of safety in the pavement and illustrates one of the many technical details the modern paving-brick manufacturer is constantly working out. Moreover, there are many other advantages in this type of brick which make it a desirable form of paver, regardless of its internal structure.

The surface dimensions (4x8½ inches) make as large a unit as can be conveniently handled and, being larger than other forms, reduce the number of joints in the pavement. Vertical fiber brick can be made by any manufacturer with slight changes in his standard equipment. Since the spacing of the wires on the cutter determines the depth of the brick, the depth can be made any dimension desired and vertical fiber brick are actually manufactured in 2½-inch, 3-inch and 4-inch depths, of which the 3-inch depth brick, weighing about 8½ pounds, is the standard.

The depth of wearing surface can, therefore, be proportioned to the class and character of traffic on the street or road to be paved. In all other forms of paving brick, the height of the die determines the depth of the brick and it is not practical, even tho desired, to make a brick less than, say, 3½ inches in depth. It is very difficult to force the clay thru a long narrow die without having torn corners, lack of uniform density and twisting strains in the clay column. In vertical fiber paving brick, the reticulated wire-cut surface is not slick and does not get slimy, but offers a gritty, slightly roughened surface for rubber tires and horses. All surface edges of the brick being square, the joints are of the same width on all four sides thruout the depth. Lugs, if desired, are formed by grooves in the die and, with bulged ends, the width of the joints can be controlled and uniform spacing provided. Thirty-five to thirty-six vertical-fiber brick will lay a square yard, instead of the forty-five required by the standard paving block, making a slight saving in all the items of manufacture, hauling, laying and joint filler. This form of brick is especially adapted to asphalt filler which, under present traffic conditions, is being used with such uniform success thru out the middle West. Lastly, one of the chief advantages in using the vertical-fiber type of paving brick, comes from the fact that tho piled on edge in the kiln, they are laid flat in the pavement, consequently all kiln marks and warps come in the joints and not in the surface of the pavement. The wire-cut surface remains a plane and the brick lay up much more evenly and smoother than is possible where the brick are set on edge.

At the suggestion of the speaker, the Western paving brick manufacturers began two years ago the making of vertical-fiber paving brick without lugs and recommended their use where asphalt filler was specified. This step was taken as the result of some special orders of lugless brick made for streets in Kansas City, Mo., in 1915 and 1916. Lugs on paving brick were invented for use with cement

grout filler to give sufficient body to the grout and allow it to penetrate to the bottom of the joint. The joints in any form of block pavement are usually the places where the first signs of wear occur, and the tendency has been to make the joint as narrow as possible. The closer the blocks are set, the more support they lend one another, the less opportunity there is for broken corners and the smoother will be the wearing surface. Narrow joints are especially desirable where asphalt joint filler is used, as the brick will then receive the wear, leaving the filler to perform the functions of waterproofing the surface and providing a thin, adhesive, elastic cushion around each block. As a matter of fact, the slight kiln marks coming in the joints and the manner of laying usually provide more space than is necessary. The lugless brick have been used, therefore, very successfully with cement grout filler, but engineers, as a rule, prefer at least one-eighth inch lugs where grout filler is to be used.

In Wichita, Kansas, lugless vertical-fiber brick with asphalt filler have been laid on the streets for the past several years at an angle of 60 degrees to the curb, practically eliminating wear at the joints and still further improving the smoothness and riding qualities. Other cities are adopting the same method.

A saving of 25 per cent. in the wearing surface over what has been considered the standard depth for brick—4 inches—is well worth making. Examination of the old 4-inch brick pavements, as well as of the 3-inch vertical-fiber brick pavements, leaves no doubt but that the thinner brick surface will be as strong and last as long as the 4-inch brick and at a considerable saving in first cost. As previously mentioned, the 3-inch brick is much the most economical size, costs the least per ton to manufacture, has been designated the standard, and is practically the only size used for streets carrying the heaviest traffic of cities or for country roads and residence streets. Other sizes are made on special order only, at an additional expense. Some cities, like Omaha, Neb., and St. Paul, Minn., are using the standard 3-inch brick set on edge where it is considered that a 4-inch wearing surface is necessary, avoiding specifying special sizes and simplifying pavement construction and repairs.

While this paper is intended as a discussion on vertical-fiber paving brick rather than on vertical-fiber brick pavements, the asphalt joint-filler almost universally used at present with this type of brick has been so interwoven with the success of vertical-fiber brick pavements, that at least a brief mention must be made of it. Four items affecting the pavement have contributed to the success of asphalt filler in brick pavements: (1) the method of application, (2) the shape and texture of the brick, (3) the quality of the filler, and (4) the changed character of traffic. Taking these items up in order, first, the bituminous filler is heated to a temperature below its flash point, is flushed over the surface of the brick pavement and squeezed back and forth until the joints are full, leaving, necessarily, a slight surplus on the surface. It is impossible to get the joints properly filled by the old method of pouring-cans. No matter how carefully the work was done, there was settlement of joints in hot weather. By flushing the hot asphalt over the brick a saving in labor is effected which more than offsets the slight additional amount of filler used. A coating of sand on the surface of the filled brick absorbs the surplus and, working into the asphalt, makes a good mastic.

In the second place, the wire-cut surface of the vertical-fiber brick which is uppermost in the pavement aids in retaining the thin asphalt mastic on the surface so that it doesn't scale off and cause a dirty street. Without lugs the brick set up close and the square edges give a minimum width, even joint at the surface. The asphalt retained on the surface is only an incident to the proper filling of the joints and is not designed to be maintained. It remains, however, from three to five years and during that time acts as a reservoir for filling joints that settle, so that by the time it has worn off, all joints are packed tight with a solid asphaltic mastic.

In the third place, only the best quality of asphaltic cement is recommended as a filler, as this has proven to be the least susceptible to changes in temperature, possesses a long life, great adhesiveness, elasticity and malleability, and resists wear and rubber-tire suction. A grade of asphalt cement of about the consistency and requirements that would be specified in the best sheet asphalt pavements for an asphaltic base manufactured asphaltic cement has proven very satisfactory. Refined tar has been used in some instances, but does not at present seem to fill all the requirements.

In the fourth place, the preponderance of rubber-tired traffic on the modern pavement has practically eliminated maintenance of joints where soft filler has been used. When asphalt filler began to be used some eight to ten years ago, it was expected that the joints would require refilling on dense traffic streets every five to seven years, but the changed traffic conditions, which have practically eliminated the horse-drawn, steel-tired vehicle and substituted the rubber-tired automobile and truck, have not made this necessary. In fact, the droppings of oil and kneading action of the tires seem to keep the filler alive and prevent any signs of disintegration, or working out of the top of the joints.

The advantages of this type of street or road surfacing may be briefly summarized as follows: (1) The street or road may be opened for traffic as soon as the filler has been applied. (2) Service cuts and openings are easily and simply repaired. (3) It carries the minimum risk in construction, since serious defects do not result thru careless workmanship, lax inspection, or ignorance,—a real advantage in these days of inefficient labor. (4) The steps in construction are simple, all material being tested before being incorporated in the pavement and an opportunity given to correct any mistakes by the following step. (5) The filler is easily manipulated, and not subject to damage by frost, rain or premature traffic. (6) Noise is eliminated. (7) It provides an ideal, non-skid, smooth riding surface for automobiles and gives a good grip for auto tires and horses on all grades. (8) Expansion and contraction are properly and effectively cared for. (9) The elastic filler cushions the brick and the foundation from shock and impact, reducing the thickness of base required and allowing slight readjustments between individual brick under traffic so that each brick remains solidly bedded in the sand cushion,—there is no necessity for a cement-mortar cushion. (10) The wearing surface, being semi-flexible, adjusts itself to slight changes in foundation conditions without damage, and to deflections in less rigid types of bases than concrete.

### PUBLIC ABBATTOIRS.

Speaking before the American Public Health Association on October 30th, John Roberts, of the Bureau of Animal Industry, said that, of more than 1400 municipalities investigated, only 195 had meat inspection of any kind, and in most of these no effort is made to maintain the Government standard.

According to John R. Mohler, chief of the bureau, however, Federal inspection is being maintained at 258 establishments in 230 cities, about 2600 inspectors being employed regularly. Those slaughter houses which sell their entire product within the state are not Federally inspected, and these furnish about one-third of the meat sold in the United States. Dr. Mohler thinks it probable that these slaughter at least 200,000 animals a year that are unfit for use as human food.

A public abattoir, according to Mr. Roberts, "affords the most practical way in which a community can properly protect its citizens against diseased and unwholesome meat, because only at such central places can a thoroughly efficient system of meat inspection be economically carried out." After sifting the reports, it appeared that only 27 cities have municipal or central abattoirs. Sixteen of the 27 are southern cities, Albany, Ga.; Macon, Ga.; Baton Rouge, La.; Winston-Salem, N. C.; Laurens, S. C.; Beaumont, Texas; Taylor, Texas; Paris, Texas; Winchester, Va.; Anniston,

Ala.; Atlanta, Ga.; La Grange, Ga.; Columbus, Ga.; Savannah, Ga.; Norfolk, Va.; and Roanoke, Va. Eight are in the northern portion of the country west of the Mississippi—Joplin, Mo.; Devils Lake, N. D.; Grand Forks, N. D.; St. Cloud, Minn.; Yakima, Wash.; Moorfield, Minn.; St. Paul, Minn.; and Lincoln, Neb. Two are in New England—Bridgeport, Conn., and Pittsfield, Mass. The remaining one is Detroit, Mich.

The number of inspectors devoting their whole time to municipal meat inspection is 226, while 182 others are engaged part time. The leading States where inspectors devote their whole time to the work are California, Ohio, Louisiana, Kentucky, New York, and Texas. Salaries average highest in Washington, Oregon, and Louisiana and lowest in Massachusetts and Indiana.

A few only of the cities have a really adequate inspection of meat. Those ranking highest in point of expenditures and number of inspectors engaged are San Francisco, Cleveland, Los Angeles, Oakland, Columbus, Louisville, New Orleans, Denver, and Philadelphia.

### HIGHWAY BRIDGES.

The Department of Public Works of the State of Nebraska, in its October monthly report, gives some general advice concerning highway bridges, as follows:

Highway and Bridge engineers in many of the Western states, following the lead of the railroad companies, have resorted to concrete masonry construction in bridge building, the chief reason being that concrete bridges when properly built, will remain as permanent structures for an indefinite period of time.

In many respects masonry arches are superior to all other forms of bridge structures. They are more stable and last longer because cement hardens with age. As a result the older a concrete bridge is, the stronger it becomes, a condition which is just reversed in steel structures which rapidly deteriorate with age.

Concrete bridges require no painting, floor renewals or other items of maintenance. Such bridges can usually be built largely of materials found in the immediate locality. Arches present a more substantial appearance than can be obtained with any form of truss. But they cannot always be built on yielding soil as the lateral thrust in the foundation is liable to cause serious injury to the structure.

Where the underclearance is not large this difficulty may be overcome by constructing a series of small arches with footings built on pile foundations. In this type the piers greatly restrict the waterway and in rivers having a marked variation in flow or much floating ice or drift some form other than an arch is usually advisable.

Concrete beam bridges, while not as permanent as arches, are extremely durable. Frequent objection has been made to the use of them for the reason that they are not susceptible to artistic treatment. This objection no longer exists and the cause of its withdrawal may readily be seen by examining some of the many beautiful examples.

In making a decision between an arch and a beam design there are several determining factors. Cost is usually the first consideration. This depends largely on the character of the banks and the depth of the stream. It also depends on facilities for obtaining and transporting materials and the availability of skilled laborers. The chief determinant however is the height of the grade above high water. Beam bridges are not suitable for carrying high fills, while arch bridges can be built to support any height of fill. Arches are especially adapted for use in deep ravines, canons, etc. where a high fill must be supported.

Simple slabs are economical for spans under 12 feet, beam bridges supported on stringers or longitudinal beams from 12 to 25 feet and slab bridges with two heavy side beams carrying lighter cross beams supporting the floor slab, 25 to 35 feet.

Beam bridges have been built up to 70 feet in length but they are not generally economical as arch bridges are cheaper.

To determine the economic length of span in an arch bridge of several spans with intermediate piers, a length should be selected such that the cost of one span will approximately equal the cost of a pier.

On very long bridges, where the grade is high above the river bed, the cost of the piers largely determines the cost of the bridge. Under these conditions it is cheaper to build long span steel bridges and to renew them from time to time, since the interest on the difference in first cost would more than offset the cost of an occasional renewal.

### HIGHWAY WORK IN NEBRASKA.

For highway work in Nebraska there has been appropriated for Federal and State aid for the years 1917 to 1921 inclusive \$11,732,850. Up to September of this year \$296,757 of this had been used, and \$149,620 was expended during September, leaving \$11,286,473 balance. Of this \$7,019,904 is available at the present time. Assuming three months of winter weather when no work can be done between now and the end of 1920, the state will need to expend, as an average for all the remaining months, nearly five times the September amount, or \$585,000 a month.

A state highway system has been laid out that totals 4,500 miles, and project statements have been made to the U. S. Secretary of Agriculture for Federal aid on 2240 miles. On October 1, seven hundred miles had been contracted for at an aggregate cost of \$2,500,000, or an average of \$3,570 a mile. At this rate of cost, the amount now available would build about 2,000 miles.

### SEWAGE PUMPING IN BUSINESS DISTRICT.

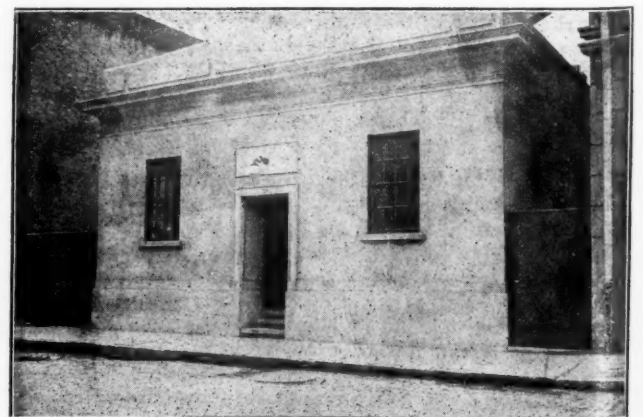
A sewage pumping station is being operated in the business district of San Francisco, which possesses some special features. It is housed in a plain concrete building on Commercial street.

The pumps are of the common type, electrically operated and automatically started and stopped. In connection with the automatic control, there is an electric alarm bell and relay system which gives an alarm at the city corporation yard should the pumps fail to keep the sewage down in the pump well. This is deemed especially desirable because of the damage that would be done to the goods in the basements of the mercantile establishments whose sewage is handled by this station, should the sewage back up because of failure of the pumps to function.

There are two vertical pumps with six-inch suction, each capable of lifting 650 gallons a minute. In addition, there is a horizontal pump with an eight-inch suction especially designed to handle rags, sticks, etc.

In entering the station, the sewage passes through a bucket screen, which is hoisted and cleaned at intervals.

The gases arising from the sewage are removed by an electrically operated blower, which discharges them into a vent pipe 75 feet high.



SEWAGE PUMPING STATION, SAN FRANCISCO.

# The WEEK'S NEWS

**Texas Counties Break Road Bond Issue Record—New British Transport Ministry Controls Highways—Sacramento's New Filtration Plant—Canton Votes for City Gas Plant—Current Shortage in Seattle—Washington Police Give Up Union—Ohio Governor Suspends Canton Mayor—Census Figures on Municipal Finance Show Big Deficits.**

## ROADS AND PAVEMENTS

### County Road Bond Issues in Texas.

Austin, Tex.—All records for issuing road bonds in the State of Texas were broken during the last fiscal year, which ended Aug. 31, when the total went to the sum of \$25,574,050. This is in contrast to a total of \$7,716,049 issued during the two fiscal years ending Aug. 31, 1918; an aggregate of \$9,751,000 during the two years terminating Aug. 31, 1916, and \$7,424,000 during the two years concluding Aug. 31, 1914. During the first seventeen days of September of this year the Attorney General approved road bonds aggregating \$2,555,000. During the two years ending Aug. 31, 1914, the larger issues were as follows: McLennan \$1,075,000. Bell \$830,000, Smith \$430,000 and Wharton \$300,000. The larger issues of the two years concluding Aug. 31, 1916, were the following: Bell \$385,000, Hopkins \$400,000, Hunt \$400,000. Wharton \$275,000, Titus \$285,000. Montgomery \$325,000, Kaufman \$750,000 Henderson \$220,00, Harrison \$300,000, Hardin \$275,00, Fannin \$73,000, Collin \$750,000, Brazoria \$325,000 and Bastrop \$160,000. For the two years terminating Aug. 31, 1918, the largest issues were Anderson \$110,000, Caldwell \$245,000, Cass \$230,000, Eastland \$180,000, Fannin \$350,000, Freestone \$350,000, Henderson \$300,000, Jefferson \$500,000, Milan \$200,000, Morris \$170,000, Navarro \$841,000, Van Zandt \$400,000 and Wood \$200,000.

### Highways Under New British Transport Ministry.

London, England—During the war the British Government assumed control of inland transportation throughout the United Kingdom. It has now decided to continue this control for two years, and to coordinate in a Ministry of Transport practically the whole of the authority of existing Government departments in relation to such matters. Within this two-year period the Minister of Transport will formulate plans to serve as the basis of a permanent policy to be defined by Parliament. Highways are included within the jurisdiction of the ministry. The importance of the new legislation is such as to warrant an enumeration of its major provisions:

A Ministry of Transport is created under a Minister of the Crown.

To the Minister shall be transferred by Order in Council the powers and duties of any Government department in relation to (1) railways; (2) "light" railways; (3) tramways; (4) canals, waterways, and inland navigation; (5) roads, bridges, and ferries, and vehicles and traffic thereon; and (6) harbors, docks, and piers; with the exception of certain powers—some enumerated in the act and others left to the discretion of the Council—which are to be withheld largely for administrative reasons.

For a period of two years the Minister will continue the existing control over railways, and he may also extend the range of Government control by taking over any other railways, privately owned "light" railways and tramways, or waterways, or any harbor not excluded by the terms of the act.

With respect to these undertakings the minister may give directions as to (1) rates of service, (2) employees' compensation, (3) operation, (4) maintenance of property, (5) additions and betterments to property, (6) coordination of facilities, (7) manufacturing and repairing, and (8) purchase and distribution of stores.

Rates established under the direction of the Minister are to continue in force for 18 months after the expiration of the interim two-year period, unless Parliament should take action to modify them. Existing agreements which the Minister shall deem consistent with the public interest are also to be continued in force for a like period of 18 months.

Owners of undertakings may recover for losses to property or earning capacity due to Government control, while the Government may recover for gains. The Treasury, upon the recommendation of the Minister, may guarantee returns on securities or payments of working expenses of undertakings under control.

The Minister may establish and operate new transportation services, subject to the approval of the Treasury; but in case

of projects involving more than a million pounds, an Order in Council is necessary. He may also purchase private rolling stock under authority of an Order in Council, approved in advance by resolution of Parliament.

Provision is made for a rates advisory committee, made up of a chairman and four other members representing the interests of trade, agriculture, transportation, and labor, all nominated by officers within the Government; and for a roads advisory committee, of not less than 11 members, 5 representing highway authorities and 5 representing users of the highways. The Minister is also required to set up a panel of experts and of important persons of commercial experience, nominated by various outside interests, to advise with respect to the extension of Government control and the establishing of new transportation services.

Under date of September 22, three Orders in Council were issued under the new act. One provided that the Ministry of Transport should receive, on September 23, the transfers of the powers set forth in the act, and in a schedule it enumerated certain sections of preexisting statutes under which control is, and will continue to be exercised by the Board of Trade. Another transfers the powers and duties of the Road Board to the Ministry of Transport; while the third sets forth the relation of the new Ministry to the Ministry of Health. Sir Eric Geddes is now Minister of Transport, and among his chief assistants are Sir Alexander Gibb, head of the civil engineering department; Sir John Aspinwall, consultant mechanical engineer; Lieut. Col. L. Simpson, mechanical engineer; Sir George Beharrell, chief of statistics and accounts; Sir Philip Nash, in charge of transportation and traffic; Sir Hardman Levere, in charge of finance; Sir C. Bartolome, in charge of development; Sir Edwin Maybury, in charge of roads; and Sir William Marwood, who will deal with questions of labor. The new Minister has already presented his view as to what is to be accomplished. Competition for traffic is to cease; and the transportation agencies of the country will be brought into working harmony. Economy is to be brought about through the reduction of terminal delay and the elimination of empty haulage. Rolling stock is to be improved and larger cars of standard design are to be introduced. Electrification is to be extended. A special effort will be made to locate new factories in the rural sections, thereby providing better service to the agricultural interests and promoting the welfare of the industrial worker.

## WATER SUPPLY

### Plans for Sacramento's New Filtration Plant.

Sacramento, Cal.—Outlining the engineering plans for the filtration plant, Charles G. Hyde, chief engineer, has announced that the engineering force would cost about \$117,000, or 6½ per cent. of the total cost of \$1,800,000. The sum voted for the filtration plant, Hyde said, would be sufficient to complete it, in all probability, and he advised the purchase of as large a site as possible to fill any future needs. In addition to himself and George N. Randle, as consulting engineers, the staff will consist of C. P. Gillespie as resident engineer, in charge of the work. H. B. Foster will be hydraulic engineer, George J. Calder will be structural engineer, and an electrical and mechanical engineer is to be secured. There will be an office engineer, with designers, draftsmen, tracers, letterers, clerks and stenographers working under him. The field engineer's force will consist of surveyors, clerks and inspectors. Ordinarily, Hyde said, 8 per cent. is allowed for engineering, but he believes 6½ per cent. will suffice for the work here. Hyde said: "The plans and specifications will be divided into

units, such as the levee, the intake tower, the sedimentation basin, the pumping station, the pumping equipment, etc., probably about twelve parts in all. On each of these divisions, contracts will be let, as the plans and specifications are ready. In this way work can be begun on the levee almost at once, while those parts requiring a great amount of time for preliminary work can be taken up later. Eighteen months should finish the job this way. But if it is the desire of the Commission to let the work out in one contract, then it will require at least six months to prepare the plans and specifications on which to call for bids, and there will be few bidders. One contract would be extremely intricate, and it would be hard to get competition. It would be of such magnitude that local bidders would be almost excluded."

#### Water Supply of Idaho Towns Below Standard.

Boise, Ida.—Water supplies of more than half of the 15 Idaho cities investigated by the state health department during four months recently were found to be "prejudicial to public health." Three of these cities, Idaho Falls, Montpelier and Twin Falls have installed proper purification systems at considerable expense. One of them, Twin Falls, has now the best filtration plant in the state of Idaho. Two others, Harrison and St. Anthony, are, in the words of Dr. E. E. Laubach, medical advisor of the department, "contemplating very material changes." Radical laws upon the disposal of sewage which is contaminating Idaho streams and lakes are likely to be asked of the next legislature. Some of the cities already investigated include Pocatello, McCammon, Idaho Falls, Victor, St. Anthony, Ashton, Avery, Lewiston, Paris, Montpelier, Emmett, Payette, Moscow, Coeur d'Alene, Twin Falls, Buhl, Jerome and Soda Springs.

### STREET LIGHTING AND POWER

#### Vote for Municipal Gas Plant.

Canton, O.—By a vote of 922 to 215, with less than one-third of the electors voting, the \$525,000 bond issue for the erection of a municipal artificial gas plant has been approved at a special election. A two-third vote was needed and the ballots in favor of the issue passed this requirement by 187 counts. The bond issue was placed before the voters as the East Ohio Gas Company has announced its intention of cutting off the supply of natural gas November 1. The gas is wholesaled to the Alliance Gas and Power company, which retails it to the city. Negotiations are now under way with the West Virginia Natural Gas company to supply Alliance with gas from its trunk mains which pass through Sebring, four miles east of the city. If this is accomplished, the artificial gas plant will not be erected.

#### Municipal Electric Plant Cannot Meet Demand.

Seattle, Wash.—Ordering the cluster street lights dimmed except for one globe only instead of three customarily used, city superintendent of lighting J. D. Ross, has called attention to a serious condition in Seattle. Due to the constantly increasing demand for electric current both for industrial uses and for lighting, superintendent Ross foresees no substantial relief until the new hydro-electric machinery and generator, purchased recently by the Board of Public Works for the Lake Union steam plant, are installed early next summer. Even with the Lake Union plant's output increased there will still be necessity for the economical use of the power available and should a large industrial plant place an order for any great amount of power the city would again be placed in the position it now finds itself. Lighting department engineers state that the natural growth of the city will require all of the power which can be obtained from the present source and the belief is expressed that until the Skagit project is in operation no permanent relief will be had. The output of the Skagit plant when completed will be ample to supply current for three cities the size of Seattle.

### FIRE AND POLICE

#### Washington Police Return Union Charter.

Washington, D. C.—The local policemen's organization has returned its charter from the American Federation of labor. The few policemen remaining in the union by a vote of 84 to 21, decided to withdraw from the Federation. The union had more than 600 members a month before, but a great many resigned, being influenced by the developments in Boston and by the determination of members of Congress to withhold pay from policemen affiliated with organized labor. C. A. Strobel, the new president of the union, said that the vote to return the charter was taken to demonstrate that Washington policemen appreciate the action in Congress in recommending an increase in their salaries. Officials said the opposition of district officials to the affiliation of the policemen with organized labor had nothing to do with the vote to return the charter. Several members declared they favored continuing their affiliation with the Federation and desired to leave to the courts the question whether they have a right to affiliate. They were overruled; however. It was said that the present union will continue as a local organization. The members hope eventually to make it the center of a National Association of Policemen. The House of Representatives, by a vote of 222 to 3, passed a bill containing the following provision prohibiting union organization among the police of the capital: "No member of the District of Columbia shall be or become a member of any organization or of an organization affiliated with another organization which holds, claims or exercises the right to demand of any of its memberships obedience to an order to strike or cease work for any cause. Upon sufficient proof to the Commissioners of the District of Columbia that any member of the Metropolitan Police of the District of Columbia has violated the provisions of this section, it shall be the duty of the Commissioners of the District of Columbia to immediately discharge such member from the service."

#### Policemen's Pay Increased.

Lynchburg, Va.—Proposed increases in the salaries of policemen have been approved by the finance committee of the city council, and the committee on police and public safety. The new scale of pay is as follows: Chief of police, salary raised from \$140 to \$155 a month; first sergeant, \$115 to \$130; second sergeant, \$110 to \$125 third sergeant, from \$105 to \$120; fourth sergeant, from \$100 to \$115; first grade private, from \$3.25 to \$4 a day; second grade private, from \$3.15 to \$3.75; third grade private, from \$3 to \$3.50; turnkey, from \$2.50 to \$3.

#### Fire Apparatus Reserve Plan Installed.

Boston, Mass.—Fire Commissioner Murphy has taken the first step to put into effect a plan for establishing a reserve supply of fire apparatus as a safeguard against conflagrations and to furnish a source upon which to draw for temporary replacements of apparatus withdrawn for repairs. The commissioner designated an old fire house as a reserve supply depot and awarded a contract for rebuilding it for this purpose for \$8442. This work is expected to make the building fire-proof and will include a steel and concrete floor. As soon as this job has been finished several pieces of apparatus will be placed in it, including department automobiles now out of active service. This station will be the first one for the reserve apparatus but Mr. Murphy expects to establish several other stations during the next few months. By Jan. 1, 1920, there should be a fairly good supply of apparatus in reserve in three or four stations which should be ready by that time. In addition to the reserve apparatus being housed in this station, when the remodeling work has been finished, it is expected that quarters will be provided for an automobile school for firemen. It is probable that commissioner Murphy will designate certain officers of the department to take charge of the reserve apparatus in case of a conflagration requiring more

than the regular active-service apparatus and they will be given a plan on which to work when such a call comes.

## GOVERNMENT AND FINANCE

### Governor Suspends Mayor.

Canton, O.—Governor Cox recently suspended mayor Charles E. Poorman from office for thirty days for alleged inefficiency in handling the steel strike riots here. The governor urged a committee of Canton business men to stand by vice mayor Schrantz in maintaining order and protecting property. The governor assured a delegation of Canton business and professional men, who came to hear the sentence of suspension, that Canton would be protected against disorder, but that the citizens must take a stand for law and order and exhaust their resources before he will act. The delegation wanted troops, but the governor demanded an attempt by Canton itself to restore order. The examination before the governor disclosed that only twenty-five rioters had been arrested; that the city had a very small police force; that citizens had made no attempt to enforce order; that the sheriff deputized no aids, and that municipal court judges dismissed rioters with light fines and suspended prison sentences.

### Census Statistics on Municipal Finance.

Washington, D. C.—In 147 of the 227 American cities of more than 30,000 population the excess of expenditures for governmental costs, including interest and outlays for permanent improvements, over revenues during the fiscal year 1918 amounted to \$70,923,990, or \$3.48 per capita. In the remaining 80 cities the excess of revenues over expenditures was \$22,323,060 or \$1.60 per capita. Taking the entire 227 expenditures over revenues amounted to \$48,600,930, or \$1.42 per capita. The net indebtedness of these cities averaged \$77.53 per capita. These are among the significant facts presented in a report entitled "Financial Statistics of Cities Having a Population of Over 30,000, 1918," just issued by Director Sam L. Rogers of the Bureau of Census, Department of Commerce. The aggregate population of these 227 cities was estimated at 34,300,000, or nearly 33 per cent. of the total population of the country. Ten cities are estimated to have more than 500,000 inhabitants each; 12, from 300,000 to 500,000; 47, from 100,000 to 300,000; 62, from 50,000 to 100,000, and 96, from 30,000 to 50,000. The aggregate revenues of all the cities during the year were \$1,124,094,899; the aggregate expenditures for current expenses and interest, \$894,332,392, and the aggregate outlays, \$278,363,437. Of the total revenues \$790,577,487, or 70 per cent. represents receipts from the various kinds of taxes. The bulk of this amount, \$705,723,158, was derived from the "general property tax," made up of taxes on real and personal property. Of the remaining receipts from taxes the largest item, \$35,576,383, was derived from taxes on the liquor traffic. This amount is smaller by \$1,398,000 than the corresponding sum reported for the fiscal year 1917, although the total number of cities covered by the report is greater by eight in the later years than in the earlier.

Next to taxes the source of the largest item of revenue is found in the earnings of public service enterprises which amounted to \$116,494,645. This sum is considerably more than double the amount of payments for expenses of public service enterprise \$55,174,480, thus leaving a net revenue from this source of \$61,320,165. The bulk of the earnings of public service enterprises came from water supply systems, from which the receipts aggregated \$90,139,705. Another important source of revenue consisted of special assessments and special charges—the bulk of which were for outlays—aggregating \$72,673,785. This sum is appreciably smaller than the corresponding amount reported for the preceding year—\$83,195,596.

For all the cities taken as a whole the per capita receipts from property taxes amounted to \$21.03; from other taxes, \$2; from earnings of public service enterprises, \$3.39; from special assessments and special charges for outlays, \$2.12, and from all other sources combined, \$4.20.

The expenditures during the year for governmental costs in these 227 cities, which aggregated \$1,172,695,829, were in the order of their importance: For expenses of general departments (legislative, executive and judicial establishments, schools, police and fire departments, sanitation, etc.), \$690,160,283; for outlays,

## LEGAL NEWS

### A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

#### Valid Interpretation of City Ordinance— Fire Prevention Requirements.

(Ala.) Where a city ordinance, like a statute, is susceptible of two interpretations, one of which will nullify, the other sustain, it, the validating interpretation should be given, though the other is the more natural.—*Birmingham Ry., Light & Power Co. v. Kyser*, 82 So. 151.

#### Power of City to Remove Obstruction.

(W.Va.) Regardless of ownership of the fee subject to easement of public street, public authorities may remove obstructions by abutting owner without liability to him where removal is necessary for reasonable public accommodation or to a system of improvements, if power is exercised reasonably and not willfully or arbitrarily.—*Jones v. City of Clarksburg*, 99 S. E. 484.

#### Informal Municipal Consent to Obstruction.

(Pa.) An obstruction in public street does not gain a legal status by inaction of public authorities, as in such case laches will not be imputed to commonwealth or to municipality, but laches may be imputed to a municipality which stands by and permits large expenditures upon faith of an irregular order of court, or of municipal consent informally or tacitly given, where formal consent would have been effective.—*City of Pittsburgh v. Pittsburgh & L. E. R. Co.*, 106 A. 724.

#### Recovery of Excessive and Illegal Taxes.

(Kan.) Where excessive and illegal taxes imposed by city of second class are involuntarily paid, they may be recovered by the taxpayer.—*Bush v. City of Beloit*, 181 P. 615.

#### Sloping Street Surface—City Liable for Letting It Be Slippery.

(Mo.App.) A city was liable for maintaining its brick paved street at a crossing in so smooth and slippery a condition that a pedestrian fell.—*Berry v. City of Sedalia*, 212 S. W. 34.

If injury results to a pedestrian on a crosswalk from a danger inherent in the adopted plan, the city is not liable, but it is if the danger has arisen from negligent construction of maintenance of the plan.—*Id.* A city was not liable for planning its streets so as to have a proper slope from the crown to the gutters; yet, having constructed a pavement on such slope, in maintaining it the city was under duty, in view of the slope, to see that the surface did not become so smooth and slippery as to render it dangerous to pedestrians.—*Id.*

#### Flooding Due to Street Grade—Dangers from Extraordinary Rainfall.

(Wis.) City held not liable to a property owner for flooding his premises on the ground that by reason of the grading of the streets more water was discharged into a ravine in the block than would have come to it in a state of nature.—*Andrus v. City of Ashland*, 172 N. W. 721.

In relation to the liability of a city for the flooding of premises by surface water, rainfalls are divided into three classes, ordinary, extraordinary, and unprecedented, and a city is not liable for damage resulting from an extraordinary rainfall.—*Id.*

\$278,363,437; for interest on indebtedness, \$148,997,629, and for expenses of public service enterprises (water supply systems, electric light and power system, docks, wharves, landings, etc.), \$55,174,480. The amount expended for outlays was somewhat smaller than the corresponding sum for the preceding year, \$386,529,990.

The average per capita expenditures for all governmental costs, including interest and outlays, in the 227 cities amounted to \$34.16, and for all governmental costs, including interest but excluding outlays, the average per capita payments were \$26.05.

## NEWS OF THE SOCIETIES

Feb. 9-13, 1920.—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention, Louisville, Ky. Secretary, E. L. Powers, 150 Nassau street, New York.

### Illuminating Engineering Society.

The thirteenth annual convention of the Illuminating Engineering Society was held at the Hotel Sherman, Chicago, Oct. 20 to 23, about 400 members and guests being in attendance from all over this country and from Canada, England and even Japan. Those present included not only illuminating engineers but also public officials, architects, educators and others interested in lighting more than twenty-five papers were read at the five technical sessions and a number of entertainment features balanced the program.

The convention was opened Monday afternoon by Homer E. Niesz, chairman of the general convention committee. Louis A. Ferguson, vice-president of the Commonwealth Edison Co., delivered the address of welcome. Louis B. Marks, of New York, replied. In his presidential address G. A. Hoadley referred to the last two conventions held under the stress of war and he reviewed in a general way the lessons of the war. The society's Committee on War Service was very active and through various subcommittees, comprising 43 members, it handled a great variety of lighting problems of great importance in the conduct of the war. These included design of lighting of aviation training camps and buildings thereon, lighting of balloon hangars and grounds, lighting of navy gun and machine shops, protective lighting of various grounds and works, lighting of government workmen's cottages, war-time lighting economies, factory lighting, hotel lighting restrictions, lighting of coal mines, metal conservation in reflectors, etc. Dr. Hoadley pointed out prices may be lowered through increase of production and this may be aided by improving the present inefficient lighting system in many factories.

F. E. Cady, Cleveland, chairman of the Committee on Progress, presented a review of the most important developments of the year in the illuminating field. Among the features mentioned was the growing use of tungsten lamps and decrease of carbon filament lamps. Among new units are the 50-watt white Mazda and the 25 and 50-watt mill type Mazda. Some new types of vapor arc lamps are reported, among them another neon lamp. Much headway has been made in searchlights. Electric headlights are being rapidly installed on locomotives and an effort is under way to standardize them. War restrictions on lighting are reviewed in the report, especially as enforced abroad. Many ingenious expedients were resorted to. Numerous new or changed installations of street lighting are referred to. Unique effects have

been produced in spectacular illuminations connected with victory celebrations in New York, Chicago, Portland, Ore., etc.

A report of the Committee on Automobile Headlighting Specifications, C. H. Sharp, New York, chairman, was presented by W. F. Little, of New York City. At the instance of this committee a three-day session was held in January of all interested in the automobile headlight problem. The committee drafted a model headlight law which was slightly revised by the Committee on Lighting Legislation. Further consideration was given to the subject of specifications for acceptability tests for headlights. Four test positions were recommended as follows:

Position 1.—Some point between road level and a point on a level with the lamps in the axis of the car—4800 cp.

Position 2.—In the axis of the car 60 in. above the roadway at 100 ft.—2400 cp.

Position 3.—60 in. above the roadway, 7 ft. to the left of the axis of the car at 100 ft.—800 cp.

Position 4.—At 100 ft. at some point between road level and a point on a level with the lamps and 7 ft. to the right of the axis of the car—1200 cp.

At the suggestion of the authorities in Connecticut these new specifications were offered. Within the past month the authorities in Pennsylvania have requested the committee for specifications to be used in that state. It was suggested that each device manufactured and sold must be accompanied with adequate instructions as to installation. Both Connecticut and Pennsylvania have established an inspector system in which their inspectors use a foot-candle meter.

The discussion was opened by J. R. Cravath, Chicago, who pointed out that positions 1 and 4 give minimum requirements. He said that inspector system should be a valuable means of improving the headlight situation and that the use of test stations in connection with garages or oil-filling stations may prove desirable. L. C. Porter, Harrison, N. J., spoke of the desirability of uniform laws in the different states. He commended a pamphlet published by the Motor Vehicle Department of California in instructing the public on this matter. The difficulties in making lamps uniform were described and he said that some flexibility in the specifications is therefore necessary. H. H. Murphy, Portland, said that Oregon is trying to make regulations similar to those of California. He believes that the public is anxious to meet any requirements that solve the problem properly. To secure uniform legislation it may be necessary to have Federal legislation. J. A. Hoeveler, Madison, spoke of the new law in Wisconsin which holds that headlights not in accord therewith are prima facie evidence of the unsafe use of highways. C. O. Bond, Philadelphia, said it was possible to use road signs as convenient test stations. Mr

Little closed the discussion by explaining the inspector system used in Connecticut. Motorcycles are used and when a driver is held up for the first time the headlight situation is explained to him in considerable detail. In Pennsylvania inspectors are to be trained for similar service. He thought that it would be desirable to have an expert adjust the head lamps in all cases.

On Tuesday morning three papers dealing with street lighting were presented, the first being by C. A. B. Halvorson, West Lynn, Mass., and A. B. Oday, Harrison, N. J., and entitled "Street Lighting with Low Mounted Units—Kensico Dam Roadway." The roadway on top of the dam is 2200 ft. long and 26 ft. wide with a 4-ft. sidewalk on one side and a stone parapet wall 4 ft. high forming the border. This dam is of imposing architectural design and it was desired to illuminate the roadway along its top without use of the ordinary lighting standards. After considerable study it was decided to use lighting units imbedded in cast-iron boxes placed in the parapet wall. This involved special designs for these boxes, for mounting of the lamps, reflectors and a baffle to cut off the direct light of the lamps, which were 6-volt, 108-watt, Mazda C units. The lamps were staggered on opposite sides of the wall and give quite a uniform and pleasing illumination of the entire roadway. The installation is unique in this respect and has been found entirely satisfactory.

The second paper, entitled "Recent Developments in Street-Lighting Units (Electric)," by A. D. Cameron, Schenectady, N. Y., and C. A. B. Halvorson, was read by the former and supplemented by illustrations described by Mr. Halvorson. In pendent units for series Mazda lamps an important addition is the combination of dome refractors and stippled or rippled outer globes. These have some advantage over the use of the refractor alone, on account of appearance and making it easier to clean the single outer surface. A new form of bowl refractor is being brought out with a closed diffusing base. In ornamental units the tendency is strongly toward single units of high candlepower instead of clusters and the standards are being made more slender and unobtrusive. An installation is being made in Saratoga, N. Y., of duplex units in which within the single outer globe there are two lamps superimposed. The lower lamp is 600 or 1000 cp. and is expected to burn until midnight, whereas the upper lamp is 100 or 200 cp. and by means of a simple cutout replaces the lower lamp after midnight, thus reducing the operating cost from then on. In parkway and residential lighting there is no need for having upward light as in case of white way lighting. Hence, the use of dome refractors and suitable globes is becoming more com-

(Continued on page 274).

# NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

## BROCKWAY HIGHWAY TRUCK.

### With Divided Body to Save Handling and Measuring Materials.

The common practice in highway construction of dumping materials at the roadside and then transporting them in wheelbarrows and measuring them into the concrete mixer involves a variety of wastes. Material is wasted in dumping and handling and time is wasted in handling and rehandling.

These possibilities of loss are said to be eliminated by the new Brockway motor truck particularly designed for highway work. The body itself is of the "all-purpose" or "utility" type, with the sides and tail gate removable so that it can be used as a flat platform body. The tail gate is also arranged so it can be swung from the top or bottom. The special feature of this body is in the arrangement of the division boards. These are spaced to hold a certain measured quantity of stone or sand, or stone and sand mixed, the spacing of these boards depending upon the size of the concrete mixer. These boards are hinged at the top and held in position by three plungers that are operated by a hand lever placed outside of the body.

In operation the truck is run under the bin and the material dumped in by use of a chute. On reaching the concrete mixer, the truck is backed up to the skip as shown in the photograph,

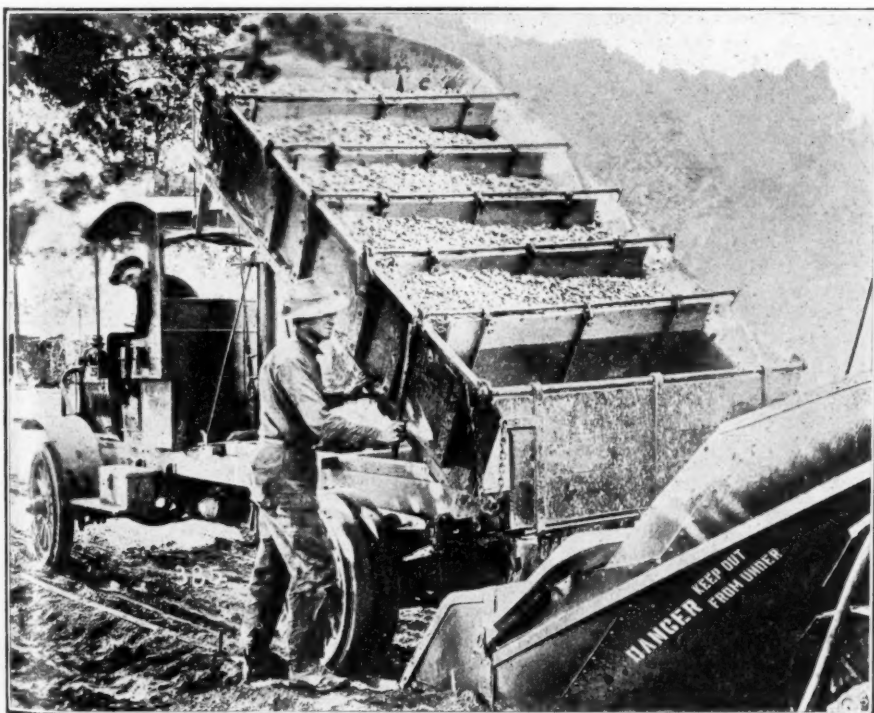
and the body hoisted, the tail gate is opened and the rear compartment, which holds one charge for the mixer, dumped into the skip. After the skip returns to position, the other compartments are emptied, one at a time, merely by pulling the lever at the side. When the truck is emptied, the body is lowered and the boards swing back into position. These division boards are all easily removable so that truck can be used for other work.

The use of this body does away with the need of wheelbarrows at the mixer, and in that way saves one handling. When hauling sand and stone mixed, the only material that has to be handled at the mixer is the cement. Another advantage is that there is no cleaning up to be done as the work progresses, as is necessary where material is dumped on the road side.

An advantage is also claimed over the industrial railway, as no tracks are needed, and the contractor has the truck for such other work as may be necessary.

It is claimed that in actual operation on highways it has been found that this body not only saves the cost of a number of men at the loading end of the mixer, but speeds up the spreading gang as there is absolutely no time lost in charging the mixer.

The truck is made by the Brockway Motor Truck Company, Cortland, N. Y.



HIGHWAY TRUCK WITH DIVIDED BODY.

## INDUSTRIAL NEWS

The Four Wheel Drive Auto Company, Clintonville, Wis., manufacturers of the F.W.D. truck, in order to handle increased business, has made an addition to its plant, of two buildings, comprising 35,196 square feet of floor space. A large quantity of new machinery has been ordered and is rapidly being installed.

Work on the new Canadian plant is progressing rapidly and soon the Clintonville plant will be relieved of all Canadian business.

The Four Wheel Drive Company reports domestic business strong with export demand unusually heavy.

### "National Motor Truck Development Tour."

Organized as a National Motor Truck Development Tour, a fleet of 20 trucks and 80 men recently completed, at Milwaukee, a 60 day tour through Illinois, Iowa, North and South Dakota, Minnesota and Wisconsin over a route 3,000 miles long, to prove to the country the efficiency of the motor truck.

All trucks ranging from one to two and one-half tons in capacity were on pneumatic tires. Rain, mud and sand provided conditions that enabled the caravan to make a record performance under adverse circumstances. There were only nine punctures on the entire tour, each truck covering close to 5,000 miles, including the extra mileage in demonstration hauls.

A United States band of 25 pieces under command of Lieut. F. M. Willson, U. S. N., from the Great Lakes Naval Training Station was a part of the expedition, the jackies riding on the trucks the entire distance. They gave concerts in the 80 towns and cities through which the party passed. Major E. M. Lubeck and Captain C. H. Mitchell of the war department at Washington were on the trip to observe the performance of pneumatic tires.

A. R. Kroh of the truck tire sales department, Goodyear Tire and Rubber Co., Akron, Ohio, was in charge of the caravan and delivered the addresses at open air meetings where farmers gathered to hear the band, inspect the trucks and see the demonstrations.

M. D. Scott, Goodyear expert on truck transportation, was in charge of the trucks and brought them through without an accident.

Over 10,000 feet of motion picture film was taken of the truck train as it journeyed over the prairies of the

middle west states. These pictures will be shown this winter before 2,600 agricultural societies.

The tour was purely an educational venture and was the first effort of the National Association of Motor Truck Sales Managers who organized recently with membership in 65 truck companies.

#### **Infringement Charged by Goodyear Tire and Rubber Co.**

The Federal Trade Commission at Washington has just issued a citation requiring the men behind the Chicago company styling themselves as the "Good Wear Tire and Tube Company" to appear before that commission and explain the reason for that name and, if possible, to show cause why they should not be required to desist from using that name in violation of the law.

According to the Goodyear Tire and Rubber Company's statement "in the citation it is brought out that this Chicago firm engages in the business of buying up second-hand or used automobile tires and then attempting, by cementing two of such used tires together and otherwise treating them, to produce a tire for sale. In the disposition of this inferior product it has been the practice of these people to advertise by catalogues, circulars, and otherwise, in an attempt to lead the public to believe that such tires are new and unused. They have also by the use of the name adopted for their firm, attempted to use the reputation acquired by The Goodyear Tire and Rubber Company in the marketing of these spurious tires. It is pointed out that the name adopted so nearly resembles and simulates the name of Goodyear as to lead the public to believe, that they are getting Goodyear products and the advantage that comes from the years of work spent in perfecting a high-quality product known all over the world, and using its high reputation in an attempt to fool the tire-buying public.

"The Federal Trade Commission also finds that this spurious company has simulated even the style of advertising used by the Goodyear company for many years, in its campaign of misrepresentation."

### **NEWS OF THE SOCIETIES**

(Continued from page 272).

mon. A new type of one-piece molded porcelain unit is being developed which includes a radial wave reflector and refractor holder. For luminous arc lamps electrodes are now being made under pressures of 500 tons per inch, which give 30 to 40% more light than the standard electrode and an increased life of from 30 to 40%. It is also expected to use glass mirror reflectors with these lamps to still further improve their efficiency. This should make it possible to use rippled outer globes in place of the clear globes now so common. The increased efficiency of the electrodes also permits the use of a lower wattage adjustment on each

lamp, thus saving 40 watts per lamp and increasing the capacity of the rectifier. In Detroit 90 to 94 lamps are now operated on each 75-light rectifier. The paper closes with a warning that the very simplicity and flexibility of the Mazda lamp, which has made it so popular in street lighting, tends toward neglect of proper cleaning and maintenance.

F. V. Westermaier, Philadelphia read a paper entitled "Recent Developments in Gas Street Lighting." It was pointed out that the police value of street lighting is its greatest importance to the public, and municipalities usually look to this protective value rather than to the illumination secured. Although this should be a municipal concern, the matter is left largely to the utilities furnishing the lighting service. Street-lighting rates are usually on a unit price contract basis and the specifications are rather infrequently changed. A constant tendency is toward cutting down expense. Taking up gas street lighting particularly, the author showed that this is usually separated into supply of the fixtures and operation and maintenance. He described several new types of multiple mantle lamps and high-pressure lamps. The latter, although considerably used abroad, have found little application in America due to the expense of separate mains and the low revenue derived from street lighting alone.

Dr. L. Bell, Boston, in opening the discussion, showed that both the Mazda and the luminous arc are keeping on developing although it was predicted that one of these would gain ascendancy. Both have distinctive fields of their own, that of the luminous lamp being for high-intensity lighting. This lamp has also increased the efficiency considerably and, moreover, has the advantage that it must be cleaned regularly, whereas incandescent units are so commonly neglected. F. R. Mistersky, Detroit, said that in that city the use of the newer magnetite electrode enabled the city to add 1100 new lamps to the former 7000 without adding to the capacity of the station. Ward Harrison, Cleveland, said it is necessary to impress on the authorities that cleaning must be done regularly, regardless of the type of lamp used, and efforts should be made to make cleaning easier. It has been found that the absorption of light by the globes is negligible as compared with that due to dirt. H. B. Vincent, Philadelphia, emphasized the need for discarding lamps that had been blackened from long use just as is the practice in interior lighting. J. W. Cowles, Boston, dwelt on the value of sparkle in street-lighting units. One objection formerly raised to incandescent units was that they lacked this, but this is now taken care of by the new ripple glass which gives the unit life and animation. Cleaning cannot be laid down in a definite schedule applicable to all streets since it depends on the amount of traffic and dirt.

C. A. B. Halvorson declared that the lighting of the Kensico dam has been found very satisfactory and it meets all requirements. He would not recommend it for universal application because the presence of crowds on sidewalks would obviously shut off the light and mud and dirt spattered by passing traffic would also obstruct the light. In the particular installation neither of these conditions existed.

"Glare Measurements" by Ward Harrison, Cleveland, was opening paper on Wednesday morning. This gave the results of tests made with a considerable number of observers viewing an opening illuminated by a lamp until this opening became objectionably glaring. One of the most important findings indicated is that the total light flux that reaches the eye from a source is the most important single factor in the production of glare. The discussion was opened by J. R. Cravath, Chicago, who said that there have been three kinds of glare tests, the first being test of eye fatigue after long exposure; the second, interference with vision, and the third, momentary or snap judgment tests.

Industrial lighting and codes regulating its practice were discussed during the rest of the session. The afternoon session was devoted to commercial possibilities, the first address being by R. M. Searle, Rochester, N. Y., on "Opportunities for Extending Lighting Through New Applications." He called attention to the opportunity for bringing up the lighting of side streets to approximately the standard of main streets so as to reduce the danger of accidents from automobiles. Highway lighting is only in its infancy and presents wide opportunities for electric lighting companies. Large possibilities lie in floodlighting of monuments, playgrounds, etc. Many other fields for lighting business development were pointed out, and Mr. Searle said that perhaps less than 25% of the lighting possibilities have as yet been developed. Discussion was opened by L. Friedman, Chicago, who called attention to the timeliness of promoting highway lighting. F. W. Willcox, London, England, made an address on "Lighting in England."

#### **Vacancies for Technical Men.**

There are vacancies for high grade technical men capable of acting as secretary or in the technical positions in the department of public works, the department of public buildings on the department of public affairs of Buffalo, N. Y., after Jan. 1, 1920. College graduates with municipal experience desired. Those interested should write, giving data as to education, training, salary and reference, to Frank C. Perkins, president, Central Council, Business Men's Association, 655 Prospect ave., Buffalo, N. Y., who has been elected councilman.

# ADVANCE CONTRACT NEWS

## ADVANCE INFORMATION BIDS ASKED FOR

## CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

### BIDS ASKED FOR

#### STREETS AND ROADS.

**Cal. Sacramento.** 2 pm, Nov. 24.  
4 mi. grading road in Del Norte co., involving 18,000 cu. yd. excav.; 6,000 cu. yd. gravel surface; 266 lin. ft. 12-in., 24 lin. ft. 15-in., 128 lin. ft. 18-in. and 120 lin. ft. 24-in. corrugated metal pipe, etc. 18.2 mi. Portland cement concr. road in Siskiyou co., involving 18,100 cu. yd. class A Portland cement concr. pavement; 6.6 mi. graded road in San Diego co., involving 73,670 cu. yd. excav.; 210 cu. yd. class A Portland cement concr. for culverts and monuments; 180 cu. yd. rubble masonry for retaining walls; 1,931 lin. ft. 18-in., 608 lin. ft. 24-in. and 18 lin. ft. 30-in. corrugated metal pipe; 1,000 lin. ft. guard rail, and 314 monuments. 13.8 mi. graded road in San Diego co., involving 111,000 cu. yd. excav.; 365 cu. yd. class A Portland cement concr. for culverts and monuments; 1,715 lin. ft. 18-in., 1,716 ft. 24-in. and 305 ft. 30-in. corrugated metal pipe; 2,000 lin. ft. guard rail, and 272 monuments—A. B. Fletcher, hwy. engr., 515 Forum bldg.

**Fla., De Soto.** noon, Nov. 25.  
10,000 sq. yd. vitr. brick paving and laying 1,500 ft. 6-in. sewer house connections.

**Fla., Fort Myers.** 230 pm, Dec. 2.  
Following municipal impvts.: 26,000 sq. yd. paving of brick, asphaltic brick blk., asphaltic concr., sheet asphalt or cement concr.; 13,500 lin. ft. combined concr., curb and gutter; 4,158 lin. ft. 8 to 24-in. sanitary and storm sewers; 27,483 lin. ft. cast iron class A 4 to 8-in. water mains—J. A. Davison & Son, city engr.

**Fla., Sanford.** Nov. 28.  
Grading and paving with brick, concr., asphalt, bituminous macadam, surface-treated macadam, etc. and constructing bridges on roadways nos. 1 to 13—William & Collier, engr.

**Ga., Americus.** 10 am, Nov. 21.  
3 mi. fed. aid. proj. no. 102, 1-course concr. or bituminous macadam, or rock asphalt, or Willite asphalt, involving 31,880 sq. yd. pavement, 11,058 cu. yd. common excav., concr. in culverts and headwalls, 200.5 lin. ft. D. S. V. pipe, 1,017.8 sta. yds. overhaul, 31,880 lin. ft. 2x8-in. wood curb, etc.—Thomas & Hawkins, engr., 302 Forsyth bldg., Atlanta.

**Ga., Savannah.** Nov. 30.  
Paving and draining 34,924 yd. hwy. in Chatham co.—W. F. Brown, engr., 310 Estill ave.

**Ga., Rome.** 2 pm, Dec. 2.  
2,848 mi. hard surface pavement (asphaltic macadam) 18-ft. wide in Floyd co. fed. aid. proj. no. 54, involving 0.55 acres clearing and grubbing; 14,627 cu. yd. common and 323.6 cu. yd. borrow excav.; 1,304 lin. ft. 12 to 30-in. D. S. vitr. clay pipe in place; 30,080 sq. yd. asphaltic macadam with macadam base, posts, etc.—J. B. McCrary Co., proj. engr., 3rd Natl. Bank bldg.

**Ga., Quitman.** Dec. 9.  
Grading and paving 7 mi. roads in Brooks co.—Garrett & Slack, engr., Montgomery, Ala.

**Ind., Indianapolis.** 10 am, Nov. 21.  
Improving 2 streets by grading and paving roadway—Bd. pub. wks.

**Ind., Albion.** 2 pm, Dec. 2.  
Road in Washington twp., Noble co.—H. C. Erwin, co. aud.

**Ind., Bloomfield.** 2 pm, Dec. 2.  
Macadam road in Highland twp., Green co.—H. Corbin co. aud.

**Ind., Danville.** 2.15 pm, Dec. 12.  
Road in Clay and Franklin twps. and road in Marion twp. Hendricks co.—C. M. Havens co. aud.

**Ind., Delphi.** 1.30 pm, Dec. 2.  
5 gravel roads in Burlington and Democrat twps., Tippecanoe, Rock Creek and Washington, Monroe and Jackson, and Burlington twps.—H. D. Good, co. aud.

**Ind., Frankfort.** 1.30 pm, Dec. 2.  
8,145 ft. gravel road in Jackson twp., Clinton co.—E. Spray, co. aud.

**Ind., Jeffersonville.** 10 am, Dec. 1.  
Macadam road in Washington twp., 14,025 ft. long—G. W. Stoner, aud., Clark co.

**Ind., Knox.** noon, Dec. 2.  
4 roads in Railroad, Washington, Davis and Wayne twps., Starke co.—C. W. Weninger, co. aud.

**Ind., Newport.** 2 pm, Dec. 1.  
3 mi. gravel road in Vermillion twp., Vermillion co.—L. F. Wright, co. aud.

**Ind., Plymouth.** 1.30 pm, Dec. 2.  
12 gravel roads in Marshall co., in following twps.: Center, German, Bourbon, Green, Walnut, Union, Tippecanoe, Polk, West and North twps.—C. H. Weber, co. aud.

**Ind., Rensselaer.** 2 pm, Dec. 1.  
2 stone roads in Newton and Marion twps., Jasper co.—J. P. Hammond, co. aud.

**Ind., Rochester.** 2 pm, Dec. 2.  
4 gravel roads in Aubenaubee, Union, Newcastle and Liberty twps., Fulton co.—E. A. Smith, co. aud.

**Ind., Salem.** 2 pm, Dec. 1.  
16,253 ft. road in Gibson twp., Washington co.—E. E. Batt, co. aud.

**Ind., Warsaw.** 10 am, Dec. 4.  
3 concr. roads in Franklin, Tippecanoe and Wayne twps. respectively and 2 gravel roads in Harrison twp.—V. D. Inger, co. aud.

**Ind., Williamsport.** 1 pm, Dec. 1.  
15,152 ft. gravel road in Kent twp., Warren co.—W. H. Stephens, co. aud.

**la., Leon.** 8 pm, Dec. 3.  
37,000 sq. yd. asphaltic concr., bitulithic, rein. concr., sheet asphalt, or vitr. brick pavement and 20,600 lin. ft. curb and gutter—Shockley Engrg. Co., 740 Reserve Bank bldg., Kansas City, Mo.

**la., Leon.** 8 pm, Dec. 3.  
10,000 sq. yd. paving with brick, rein. concr., sheet asphalt, asphalt concr., or bituminous concr., est. \$150,000—C. A. Shockley, 740 Reserve Bank bldg., Kansas City, Mo.

**Kan., Abilene.** 2 pm, Dec. 1.  
Fed. aid. proj. no. 32 in Grant and Center twps., Dickinson co., involving paving with monolithic brick, bituminous filled brick, bituminous filled brick or 2-course concr., 18 ft. with one 4-ft. and one 10-ft. wide earth shoulders, 23,987 ft. in length; also 20,906 ft. fed. aid. proj. no. 29, involving paving with monolithic brick, bituminous filled brick or 2-course concr., 18 ft. wide with 4-ft. wide earth shoulders—H. W. King, co. clk.

**Kan., Emporia.** 1.30 pm, Nov. 26.  
Section of fed. aid. proj. no. 30 in Lyon co., 23.00 ft. 18-ft. road of 1 course concr., 2-course concr., monolithic brick, or bituminous filled brick on sand cushion with concr. base, with 5-ft. earth shoulders on each side, etc., involving 16,406 cu. yd. earth 47,400 sq. yd. paving, 639 cu. yd. concr. in culverts and bridges and 25,933 lbs. reinforcing steel—G. L. Miller, co. clk.

**chac to Labranch;** 15.93 mi. from Labranch to West End, Tangipahoa, St. John the Baptist, St. Charles and Jefferson parishes—Duncan Buie, state hwy. engr., 736 Maison Blanche annex.

**La., New Orleans.** noon, Dec. 8.  
Following sections hwy.: 7.75 mi. Franklin-Thibodaux hwy. in St. Mary parish; 11.53 mi. Oberlin-Alexandria hwy. in Allen parish; 10.24 mi. Oberlin-Lake Charles hwy. in Allen parish; also 15.96 mi. St. Joseph-Winnsboro hwy. in Tensas parish—Duncan Buie, state hwy. engr., 736 Maison Blanche Annex.

**La., South Highlands.** Dec. 5.  
Paving various vil. streets, involving 65,000 sq. yd. asphaltic concr. (Topeka mix) on concr. base, 27,650 lin. ft. concr. curb, 8,100 lin. ft. rein. concr., and 2,600 lin. ft. concr. or vitr. pipe storm sewer—H. E. Barnes, engr., Shreveport.

**Md., Baltimore.** noon, Nov. 28.  
State road in Faulkner—P. H. Zouck, chn., state road comm., 601 Garrett bldg.

**Mich., Lansing.** 1.30 pm, Nov. 28.  
5,984 mi. 16-ft. class B gravel road in Otisco twp., Ionia co.—F. F. Rogers, state hwy. comr.

**Mich., Lansing.** 10 am, Dec. 2.  
Improving 48,503 mi. road in Powell, Champion, Ishpeming, Marquette and Negaunee twps., and Negaunee city, Marquette co., by grading and drainage structures, involving 231 acres clearing; 34,385 sq. yd. grubbing; 474,327 cu. yd. earth, 81,610 cu. yd. loose rock, 5,132 cu. yd. solid rock and 21,778 cu. yd. ditch excav.; 89,202 lin. ft. guard rail; 1,667 cu. yd. retaining wall, (rubble); 63,231 lbs. steel reinforcement in culverts; 12,912 lin. ft. installing corrugated iron culverts, etc.—F. F. Rogers, state hwy. comr.

**Mich., Freeman.** Nov. 30.  
1 mi. 12-ft. class B state reward road and 1½ mi. 12-ft. road in Glare co.—J. W. Wilson, twp. clk.

**Minn., Crookston.** 2 pm, Nov. 24.  
12 mi. fed. aid. proj. no. 80, involving 13 acres clearing and grubbing, 27,993 cu. yd. excav., 33,431 cu. yd. haul, 1,398 lin. ft. 12 to 30-in. portable culverts, 48 rein. concr. culverts, and 14,229 cu. yd. gravel surfacing; 10 mi. fed. aid. proj. no. 94, involving 82,774 cu. yd. excav., 86,516 cu. yd. haul, 326 lin. ft. 12 to 36-in. portable culverts, 12,000 cu. yd. gravel surfacing, etc.; 1¼ mi. fed. aid. proj. no. 1913, involving 14,316 sq. yd. concr. paving and 14,320 ft. drain tile, all in Polk co.—H. J. Welte, co. aud.

**Miss., Jackson.** noon, Dec. 10.  
4.5 mi. fed. aid. proj. no. 81 in Bolivar co., involving 23,600 sq. yd. concr. pavement, 60,000 cu. yd. grading, 4,080 cu. yd. gravel in place, 5,700 lbs. steel, etc.—X. A. Kramer, state hwy. engr.

**Miss., Jackson.** 2 pm, Dec. 16.  
3.6 mi. fed. aid. proj. no. 80 in Adams co., involving 4.3 acres clearing and grubbing, 30,000 cu. yd. excav., 5,700 cu. yd. gravel, etc.—X. A. Kramer, state hwy. engr.

**Miss., Jackson.** 2 pm, Dec. 17.  
17.9 mi. fed. aid. proj. no. 41 in Wilkinson co., involving 47 acres clearing and grubbing, 108,000 cu. yd. excav., 12,000 cu. yd. borrow, 270 cu. yd. concr., 1,000 lin. ft. culvert pipe, 105,000 ft. lumber in bridges, 3,900 ft. piling, 20,550 cu. yd. gravel, 13,000 lbs. reinforcing steel—X. A. Kramer, state hwy. engr.

**Miss., Jackson.** noon, Dec. 9.  
13.1 mi. fed. aid. proj. no. 61 in Sharkey co., involving 1 acre clearing and grubbing, 78,132 cu. yd. embankment, 356 lin. ft. 18-in. and 114 lin. ft. 24-in. corrugated metal pipe, 12,946 lbs. reinforcing steel, 107,293 sq. yd. concr. paving, etc.—X. A. Kramer, state hwy. engr.

**N. J., Trenton.** 10.30 am, Nov. 26.  
Resurfacing road in Burlington co. with gravel—A. L. Grover, chf. clk., state hwy. dept.

**N. Mex. Santa Fe.** 2 pm, Nov. 25.  
1.71 mi. Tijeras Canyon Cooperative Forest Aid proj., in Bernalillo co., involving 2,866 cu. yd. class 1, 545 cu. yd. class 2 and 517 cu. yd. class 3 excav., 2,741 cu. yd. class 1 borrow, 276 lin. ft. 18 to 36-in. corrugated metal culvert, etc.—L. A. Gillett, state hwy. engr., Capitol bldg.

**N. C., Raleigh.** noon, Nov. 25.  
3.76 mi. state hwy. in Buncombe co., involving 39,200 sq. yd. concr., or Topeka or Penetration macadam surfacing; 1.61 acres clearing and grubbing; 32,308.9 cu. yd. earth excav.; 3,977.02 cu. yd. earth borrow, 158.5 cu. yd. rock excav.; 118.8 cu. yd. class B concr. (headwalls); 756 lin. ft. 18-in., 266 lin. ft. 24-in. and 124 lin. ft. 30-in. vitr. sewer pipe; four 4x3 culverts; 40-ft. concr. bridge; 10,337 lbs. reinforcement, etc.—W. S. Fallis, state hwy. engr.

**O. Cleveland** Nov. 22.  
Grading, draining and paving road—W. A. Stinchcomb, co. engr.

**O., Euclid.** Dec. 8.  
Improving 1 mi. road—F. A. Pease Engrg. Co., Marshall bldg., Cleveland.

**Okla. Tulsa.** 2 pm, Nov. 23.  
Grading and draining openings in various roads in Tulsa co.—D. V. Patton, co. engr., courthouse.

**Tex., Fort Worth.** Nov. 25.  
Paving 2 streets.—City engr.

**Tex., Tyler.** 2 pm, Dec. 1.  
Grading, draining and surfacing 7.82 mi. state hwy., fed. aid proj. no. 115, involving 41,443 cu. yd. earth excav., 37,290 sq. yd. cement concr. pavement, 11,717 gravel-clay surfacing from local pits, 388 cu. yd. class A concr. in bridges and culverts—D. K. Caldwell co. hwy. engr.

**Wash., Tacoma** 11 am, Nov. 28.  
Clearing grubbing and grading section of roads; also grading, draining and paving 2 roads in Pierce co.—Co. engr.

**W. Va., Charleston.** 5 pm, Nov. 28.  
Grading, repaving and re-surfacing with asphalt over old brick pavement several streets, involving 50,000 sq. yd. repaving and re-surfacing—E. Bruce, city engr.

## SEWERAGE.

**Fla., Fort Myers.** 2.30 pm, Dec. 2.  
See "Streets and Roads."

**la., Dubuque.** 8 pm, Nov. 24.  
279 lin. ft. 8-in. tile pipe sanitary sewer and 2 manholes—J. Stuber, city recorder.

**La., New Orleans.** noon, Dec. 15.  
Sewerage and water works—F. S. Shields, secy., Sewerage and Water Board.

**N. J. Newark.** 10 am, Nov. 25.  
Completion of constr. of sect. 2 of out-fall pressure tunnel beneath portion of New York bay and Jersey City in Hudson co., N. J.—Passaic Sewerage comrs., Essex bldg., 31 Clinton st.

**N. Y. Rye. (Change of date.)** Nov. 24.  
Sanitary sewers and sewage disposal units, involving 31,100 ft. 8-in. and 580 ft. 15-in. vitr. pipe sewers, 7,100 ft. 6 to 16-in. iron pipe, siphon and force mains, also 1 pumping station, sewerage tanks, sprinkling filters and sand beds with appurtenances—G. E. Hill, engr., 45 Seventh ave., N. Y. C.

**O., North Canton.** noon, Nov. 21.  
Storm water sewer in vil. street and extending water mains in another street—R. M. Rice, engr., 519 Daily News bldg., Canton.

**Tex., Cooper.** 10 am, Nov. 21.  
27,000 sq. yd. street paving and 18,000 lin. ft. curb and gutter—C. E. Cock, city engr.

**Vt. Burlington.** noon, Dec. 22.  
Tile underdrain in city street—T. W. Dix, engr.

**Wash. Wenatchee.** Nov. 24.  
Improving avenue by sewers, catch basins, inlets, etc.—City engr.

## WATER SUPPLY.

**Fla., Fort Myers.** 2.30 pm, Dec. 2.  
See "Streets and Roads."

**La., Kaplan.** Nov. 25.  
Installing water system, reservoir, water pipe lines, valve, hydrants, tower and tank, etc.—X. A. Kramer, engr., Magnolia, Miss.

**Neb., Randolph.** 8 pm, Nov. 30.  
Extending water mains (4-in.)—Ray Kirk, clk.

**Neb., Randolph.** 8.30 pm, Nov. 30.  
Extending 4-in. water mains in city street—X. R. J. Kirk, clk.

**O., Ansonia.** Nov. 24.  
Installing municipal water and light plant, including two motor drive-pumps of 300 gal. capacity per minute—Vil. clk.

**O., Euclid.** Dec. 8.  
Constructing 6-in. water main in two streets and 8-in. water main in one street—F. A. Pease Engr. Co., Marshall bldg., Cleveland.

**O., Toledo.** noon, Nov. 25.  
Furnishing one 42-in., six 30-in. flanged hydraulic valves and eight 30-in. hub-end hydraulic valves; 312 lin. ft. 42-in. and 16,000 lin. ft. 30-in. class C bell and spigot cast iron pipe; 9 tons 42-in. and 20-in. flanged special castings; 45 tons 42-in. and 30-in. bell and spigot special castings, —W. G. Clark, constt. engr., 1047 Spitzer bldg.

**Okla., Shawnee.** Nov. 29.  
Water works system—F. D. Brown, city engr.

**S. C., Fountain Inn.** 3 pm, Nov. 27.  
Furnishing two belt-driven, single-stage air compressors; one air receiver; air lift pumping equipment for two wells; one 10-H. P. electric motor; one 12-H. P. gasoline engine; one 500-G. P. M. centrifugal pump, direct connected to 50-H. P. electric motor; one 500-G. P. M. centrifugal pump, direct connected to 60-H. P. vertical 4-cylinder gasoline engine (alternate bid on horizontal 60-H. P. 2-cycle gasoline engine); all piping, valves and connections; switch board and electric regulating appliances—D. M. Garrett, chn., bd. pub. wks.

## LIGHTING AND POWER.

**P. R. Point Borinquen.** Dec. 17.  
Light station here—Comr. light houses, Washington, D.C.

**W. Va., Charleston.** noon, Nov. 25.  
Subletting constr. of 2 transmission lines included in contr. between U. S. Government and Virginian Power Co., as follows: Gov. line no. 2, 33.8 mi. single circuit, 66,000 volt, steel tower transmission line; Gov. line no. 24, 6.5 mi. double circuit, 44,000 volt, steel tower and wood pole transmission line—Virginia Power Co.

## BRIDGES.

**Kan., Abilene.** 2 pm, Dec. 1.  
Bridge work in Dickinson co., including one 20-span rein. concr. thru girder bridge, involving 159.9 cu. yd. concr. and 4,818 lbs. steel; three 24-span thru girder bridges, 28-ft. roadway and one 40-span tee girder bridge with 20-ft. roadway—H. W. King, co. clk.

**Minn. Bemidji.** 2 pm, Dec. 5.  
Furnishing and installing 30 culverts of corrugated metal on judicial ditch no. 36 and 30 metal culverts on judicial ditch no. 30, average haul 40 mi.—A. D. Johnson, co. aud.

**Mich., Lansing.** 1.30 pm, Nov. 25.  
State reward bridges nos. 4, 10, 41, and 42—F. F. Rogers, state hwy. comr.

**N. C., Greenville.** Dec. 1.  
Reconstructing bridge over Tar river, 6 spans, total length 273 ft.—J. B. Harding, hwy. engr.

**O., Columbus.** Nov. 24.  
Asphalt pavement for bridge over Alum creek, involving 950 sq. yd.

**Wis., Milwaukee.** 10.30 am, Dec. 10.  
North Ave. viaduct and side approach over the C. M. & St. P. Ry. tracks and Milwaukee river, including concr. viaduct consisting of 183 ft. retaining wall with earth fill; 142 ft. concr. beam-and-slab constr.; 141 ft. steel girders, concr. encased, over C. M. & St. P. Ry. tracks; 348 ft. concr. beam-and-slab constr.; and 571 ft. concr. arch, 3 arch spans, over Milwaukee river; total width 61 ft. 6 in. with 40 ft. clear roadway; side approach 600 ft. long and 28 ft. wide, and a stairway—Supt. bridges and pub. bldgs.

**Cuba, Santo Domingo.** Jan. 15.  
Rein. concr. bridge and approaches over Rio Yague del Norte on road from Monte Cristi to Dajabon, in province of Monte Cristi, Dominican Republic, to consist of 2 rein. concr. cantilever arches of 100 ft. span each, 2 cantilever concr. approach spans of 42 ft. each and 2 approach fills each 200 ft. long, over all length, 314 ft. and out width 18 ft. 9 in.—A. J. Collett, dir. gen. pub. wks., Dominican Republic

## MISCELLANEOUS.

**D. C., Washington.** 10.30 am, Nov. 21.  
Furnishing wrought iron pipe, brass tubing, etc.—A. L. Flint, gen. purchg. officer, Panama Canal.

**D. C., Washington.** 10.30 am, Nov. 21.  
Furnishing wrought iron pipe, brass tubing, etc.—A. L. Flint, gen. purchg. officer, Panama Canal.

**la., Indianola.** 10.30 Nov. 26.  
New channel for Otter Creek in drainage dist. no. 5—A. S. Van Sandt, engr., Clarinda.

**la., Toledo.** Nov. 25.  
System of tile lines—V. P. Conkey, Tama co. engr.

**La., New Orleans.** 11 am, Dec. 1.  
Furnishing and placing 25,000 tons stone and 5,000 cords willow brush along jetty at South Pass—U. S. Engr. Office, Customhouse.

**Mich., Detroit.** 11 am, Nov. 25.  
Dredging and rock excav. on Livingstone channel, Detroit river—U. S. Engr. office.

**Minn., Fairmont.** 1.30 pm, Nov. 25.  
Judicial ditch no. 81, including one retaining wall and outlet, 150 12-in. sewer pipe for 3 railroad crossings, 50 ft. 14-in. iron pipe for 1 railroad crossing, 217 ft. 14-in. pipe, 400 ft. 14-in. tile, 3,300 ft. 12-in., 1,350 ft. 10-in., 4,600 ft. 8-in., 1,650 ft. 7-in. tile—H. C. Nolte, co. aud.

**Minn., International Falls.** 2 pm, Dec. 3.  
Culverts on judicial ditch no. 36 in Belt-rami co.—A. D. Johnson, co. aud.

**Minn., Waseca.** 2 pm, Nov. 22.  
Co. ditch no. 19, involving 1,850 ft. 18-in. and 1,900 ft. 14-in. tile, one concr. bulkhead, 2 surface inlets, etc.—T. Peterson, co. aud.

**Miss., Lake Cormorant.** Dec. 2.  
67 mi. open drainage canals in Tunica and De Sota cos., 12 to 70-ft. bottom widths, involving 3,340,000 cu. yd. floating dredgework—Morgan Engrg. Co., Goodwyn Institute bldg., Memphis, Tenn.

**Mo., Trenton.** 4 pm, Dec. 1.  
95,500 cu. yd. earth excav. in drainage dist., Wilson twp.—M. H. Mooney, engr.

**N. Y., New York.** noon, Nov. 21.  
Dredging in channel between Staten Island and Hoffman and Swinburne Islands, New York harbor—U. S. Engr. office, 39 Whitehall st.

**N. Y., New York.** noon, Dec. 3.  
Dredging and removing rocks in East river—U. S. Engrg. Office, 39 Whitehall st.

**N. Y. Albany.** noon, Nov. 25.  
Improving state canals as follows: Completing prism excav. between Fairport and King's Bend; completing excav. of canal channel in Genesee river; also constructing barge canal terminals; extension to existing docks at Cohoes; barge canal terminal at Hallet's Cove, boro of Queens, N. Y. C.; furnishing and installing four 2-ton electric semi portal revolving jib cranes on Barge canal terminals, two each at Greenpoint and West 53rd st., N. Y. C.; constructing headhouse and installing water main and electrical work on pier 93, West 53rd st., N. Y. C.—E. S. Walsh, supt. pub. wks., Capitol.

**N. Y., Buffalo.** 11 am, Dec. 2.  
Constructing locks on Buffalo river and southerly ramp of Hamburg turn-pike on approach to bridges and viaducts over Ship canal and Buffalo creek railroad tracks; also concr. dock on channel side of Bird Island pier—A. W. Kreinheder, comr. pub. wks.

**O., Toledo.** noon, Dec. 9.  
Contr. no. 1 of Ten Mile Creek intercepting sewer, consisting of a 72-in. circular sewer, 17,080 ft. long and one 1,400 ft. long, manholes and appurtenances—D. H. Goodwillie, dir. pub. serv.

**Pa., Pittsburgh.** 11 am, Dec. 2.  
Public hwy. tunnel and approaches, 6,289 ft. long, consisting of 2 separate parallel tubes 59 ft. between centers, each 26 ft. wide—A. D. Neeld, constt. engr., 508 Bakewell bldg., Grant and Diamond sts.